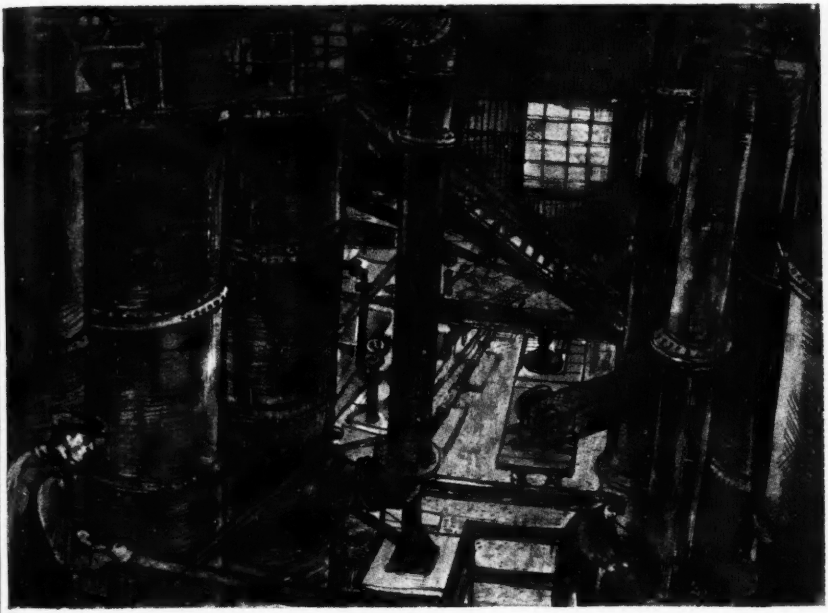
The

CHEMICAL AGE

VOL LX 22 JANUARY 1949 No. 1541

INDEX TO ADVERTISERS
IN THIS ISSUE



The Chemical Age

A Weekly Journal Devoted to Industrial and Engineering Chemistry

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THE CHEMICAL AGE offices are closed on Saturdays in accordance with the adoption of the five-day week by Benn Brothers Limited

VOL. LX
No. 1541.

22 January 1949

Annual Subscription 26s.
8d. per copy, post paid, 10d.

Resurgence of Western Germany

THE French politicians, who have forcibly expressed their alarm at the trend of economic affairs in Western Germany, are not unsupported in the view that the country's power to upset the domestic affairs of Europe is not entirely dissipated. The objections which the French have successfully advanced are, of course, concerned with national security, and are justified by what has been their country's experiences in two wars and of European disregard for security measures soon after the 1914-18 conflict had ended. So fine, however, is the line which divides economic predominance from the capacity for territorial conquest, that there is little to distinguish the warnings issued in France from the growing belief in this country that Germany is being groomed, with the fullest co-operation of Great Britain and America, to become a formidable commercial competitor in just those departments of production by which modern warfare is sustained.

Chemicals, scientific instruments and heavy engineering are now being noted as among the industries in Germany which have thrown off almost entirely the restraints which were regarded at the end of the war as being more less permanently necessary. Not only have the brakes been removed, industry and the Western German economy at large have been stimulated by approximately £25 million worth of raw materials from the occupying powers each quarter since 1947. The process has been almost inevitable, encouraged by the clear necessity to enable Germany to become self-supporting in the shortest time, and to that has now been added the need to set up in the Western zones the best conditions of living and employment attainable. In this atmosphere of political rivalry many of the early precautions have gone with the wind. Allied commanders of all ranks have understandably seen it their duty above all else to achieve good order and a productive economy in their areas, without much thought for the ultimate results of their labours.

Some of the more immediate of those results are now becoming visible and leaders of more than one industry here are finding disconcerting evidence that Germany, under the artificial conditions of currency value and labour costs still prevailing, is producing plant and material for export at prices far lower than British industries, with their very different standards, can offer.

It is worth noting that one of the outstanding examples of this process concerns the production of scientific instruments, in which German predominance in decades gone by has been the cause of great handicaps to this country at the outbreak of two wars. The embarrassing situation which is arising has been well described by an authority, Mr. J. E. C. Bailey, president of the Scientific Instrument

On Other Pages

Association, who has previously given warning of the trend of events. (THE CHEMICAL AGE, 48, 563-4.) "The rate of pay of the German scientific instrument maker," says Mr. Bailey in a letter to *The Times*, "is at the most 1 Deutchemark 20 pfennigs an hour; in other words 1s. 9d., as compared with the rate of 3s. or more paid to this country. From all over the world come reports of German prices being considerably below those of British counterpart goods, and one example which has recently been brought before this association is in connection with an order placed by a colonial Government for 400 microscopes with Leitz, of Weizlar, at a price £10,000 below the lowest British tender. In the field of camera production the position has now reached a critical stage, as Germany is fast regaining all her former world markets at prices 30 to 40 per cent below British prices. The view expressed by His Majesty's Government is that as Germany becomes more self-supporting so wages will rise and thus automatically increase the prices of finished articles, but in this connection it is interesting to place on record that Leitz, of Weizlar, have recently announced considerable reductions in the prices of their range of cameras.

"We feel that the scientific instrument industry has a great part to play in assisting other industries to increase their productivity and to assist in research in all the various branches of science, apart from its own contribution to the export trade, which now runs to approximately £10 million a year. It is, however, the considered opinion of this industry that unless steps are taken now to stop unfair German competition history will repeat itself. The industry, expanded to play its full part during the 1914-18 war, was subsequently reduced by German competition to a 'cottage' industry, and that would appear to be its fate yet again."

This is no isolated appeal inspired by the self interest of one industry. The same story has been told in very similar terms in the contexts of pumping equipment, which is the basis of so much chemical plant, internal combustion engines and motor cars. Now that the mark has been revalued at the higher rate of 1s. 6d. (30 cents) some of these exports will approximate more nearly to world values; but here again the artificial situation in Germany complicates the issue, the Joint Export Import Agency having ruled that outstanding contracts, which were substantial, in view of the low prices, should be fulfilled at the advantageous rates prevailing earlier.

Simultaneously, German chemical pro-

(*Continued on page 146*)

NOTES AND COMMENTS

Bureaucracy

"I MAKE no secret of my apprehensions over the Government's programme for nationalising certain industries, such as iron and steel; I fear the dead hand of bureaucracy, which in my view is bound in the long run to infiltrate into these industries, and I do not believe for a moment that Government ownership of an industry will cause it to be more efficient." That is the considered view of Lord McGowan, shared by a great body of opinion, whose conviction has been strengthened by what has been manifest in recent months. The significance of this observation by Imperial Chemical Industries' chairman—part of a 1949 message to the group in *The I.C.I. Magazine*—is not contained in its originality, but in the fact that expressions of opinion on Government policy from this quarter have been singularly rare in the past. "Management must take risks," writes Lord McGowan, "if these risks fail then the management can be dismissed by the shareholders. It is not so in a nationalised industry. . . ." These observations have since acquired a more intimate application to chemical industry from the confirmation that Labour interests are now actively pursuing their endeavours to secure State control here.

Supporting View

THE statement appears to indicate that the apparent stoicism with which leaders of some great industries have witnessed the spread of nationalisation over neighbouring fields is giving place to a more positive attitude. Gross errors have been made and have brought no sign of repentance, or even caution, from the culprits. Patience and endurance can be carried to unreasonable extremes and many will welcome the growing realism in current opinion, of which a forthright example comes in another presidential message, by Sir Patrick Hannon, M.P., to the National Union of Manufacturers. "Free enterprise," he writes, "must in the national interest continue to put forth its maximum efforts—under illogical conditions which compel it to obtain from the State monopoly practically all its essential basic materials and services at unpredictable prices and of unknowable quality." That serves as a footnote to his firm conviction that "the continuance of wisely directed free enterprise is essential to Britain's economic health and prosperity and the administrative machinery of the country by its very nature and constitution is unsuited for the control and direction of productive industrial enterprise."

Belated "Expulsions"

THE Soviet reaction to Sir Henry Dale's recent expression of the views which most scientists must hold about the Russian Academy of Sciences' treatment of some of its own members has taken the form of expelling him from honorary membership. The gesture would have been more impressive had Sir Henry Dale not already resigned. (THE CHEMICAL AGE, *49*, 747.) But the fury engendered by Sir Henry Dale's exposure of the Academy's extraordinary and sinister methods of enforcing belief in the politically acceptable theory, in genetics, of the inheritance of acquired characteristics, is real enough; it has involved also Dr. Herman Muller, the U.S. geneticist, who also ended his association with the academy last year, and Mr. Olaf Broch, the Norwegian philologist. They are (symbolically) deprived of their corresponding membership "for activity directed against the Soviet Union." All of which bears the accustomed stamp of unheeding fanaticism which also characterises the final declaration by the contemporary bear leaders of organised science in Russia that "all are tools in the hands of reactionaries." The theme is becoming increasingly familiar. Impartiality, in scientific research as in any other intellectual function, is not permitted in totalitarian communities.

The German Parallel

IT does not require much study to reveal the parallels between the official estimation of scientific values in the U.S.S.R. to-day and under the system which exercised similar powers in Germany until 1945. German scientists, out of favour long before 1939 for their unwillingness to swallow racial and other theories useful to the totalitarian method, played as a whole a remote part

in the events culminating in national disaster for their country. The scientists themselves have, of course, the best of incentives at the moment for pleading that they were remote from Germany's unsuccessful excursion into barbarism, but some —like the physicists, for whom Dr. Werner Heisenberg, of the Max Planck Institute of Physics at Goettingen University, has lately been acting as spokesman—have good reason to reject responsibility for Germany's failure to maintain the lead in scientific warfare. The knowledge that Germans, Dr. Otto Hahn and Dr. F. Strassman, had split the uranium atom in 1938 is not easily reconciled with the fact that German nuclear physicists had nothing else to offer before the atomic bomb was used at Hiroshima.

Physicists Rebuffed

THE reason, Dr. Heisenberg is reported to have told the *New York Times*, is that leading German physicists distrusted the régime, and the régime never trusted the physicists, as American physicists were trusted. In 1939, he recalls, Germany had one cyclotron, while the U.S.A. "had about a score" and the German Government and the Army dismissed as unreal the possibility that an atomic bomb could be made in time. The effect of totalitarian power over scientific resources and initiative, as represented by Dr. Heisenberg, was paralysing. He has what he claims is a list of 300 reports by German scientists (Drs. Bothe, Harteck, Haxel, Houtermans, von Weizsaecker and Wirtz among others), on the application of chain reactions. These, he says, are now held in Washington, so that German nuclear physicists' prospects of being exonerated on the charge of lack of enterprise are not promising.

Unwelcome Census

Manufacturing chemists and chemical concerns in Scotland have commented adversely on the Board of Trade census proposals, in connection with which they have lately received official booklets. One view advanced in Edinburgh is that the information wanted could facilitate nationalisation projects, and compilation of the data required will take valuable time and labour which should be concentrated on the work of production. It is also stressed that the information is likely to be out of date when it is finally collated. Firms without a complex costing system will find it difficult to give the desired information.

RESURGENCE OF WESTERN GERMANY

(*Continued from page* 144)

duction has been reviving on a much larger scale than wartime destruction and Allied prohibitions seemed likely to permit. While it would be ungenerous to disparage the enterprise and the will to work—which last week raised German coal output to the record level of 326,000 tons per day—they would be applauded more readily if there were firmer assurance that the expanding chemical potential will not be used some day for lethal purposes.

The profound change which has taken place since the Allied plan for the future control of German chemical industry was formulated has been watched with some apprehension by many, among whom the Chemical and Allied Trades Section of the Manchester Chamber of Commerce has noted what has been happening without any evident approbation. "In August last year," the section recalls in its current annual review, "a revised plan was issued by the Allied Powers for the German chemical industries, under which it was estimated that in years to come the level of production over all sections of the German chemical industry would roughly correspond with the 1936 level of output. Disagreement among the occupying nations has resulted in the abandonment of this project, and piecemeal development of this the German industry is now taking place in order to secure the maximum aid to the German economy.

"It is therefore reasonable to assume that exports from German sources must realistically be expected in the future. This change of policy has been dictated by international events and must be regarded in that light. In the meantime, valuable equipment and machinery earmarked as war reparations, are dismantled and rusting in Germany, as the four Powers cannot agree on their division. It seems they may well have completely disintegrated before any decision is recorded about them, and what might once have been a valuable asset to the industry may now virtually be discounted."

SUSTAINED PROGRESS IN 1948

Manchester Chemical Section Reviews the Prospects

THE active interest of the Manchester Chamber of Commerce in the whole field of chemical industry is reflected in the annual report, issued last week, of the Chemical and Allied Trades Section, at which Mr. Forrest Hewit, the retiring chairman, presided.

At a meeting of the section on January 11, Mr. T. C. Fawcett was elected chairman for 1949.

The annual report of the section observes that the year has been one of sustained progress by chemical industry. Happily, it recalls, there were no severe dislocations of effort such as the 1947 fuel crisis, and although the year has not been without its difficulties, results may be regarded as eminently satisfactory, considering limitations imposed on production in view of the general economic position of the country.

In accordance with the wishes of the Government, the fullest priority has been given to meeting the needs of those home industries which primarily manufacture goods for export.

It is indeed a tribute to the chemical industry that in addition to meeting such urgent requirements, it has also been possible to increase direct exports of the products of the industry, so that there is every reason to believe that the Board of Trade's year-end export target (£8.05 million worth of chemicals per month) will be achieved, states the report.

Trade Agreements

A most important decision has been reached by the Government, as a result of representations by the Association of British Chambers of Commerce, namely, that industry should be consulted before the negotiation of the various bilateral trade agreements at present contemplated, where a collective opinion would be of value to the Board of Trade.

Previously, such consultation with the industry has not taken place, subsequent notification of arrangements made being the only intimation of these agreements.

The Manchester Chamber will be invited to submit its view as a constituent member of the association, and members of the section have been invited to forward their comments to the executive.

One of the factors which has most seriously affected the possibility of substantially increasing output has been the Government's decision (taken late in 1947) severely to restrict the capital development of industry.

At the end of the year it was understood, however, that suitable capital development will now be permitted and that building licences, vitally necessary for improvement of existing plant and the extension of factory premises, will receive more sympathetic consideration and higher priority than they have in the past.

Employment

But it takes time to erect new buildings and modernise present works, and it will be some time before plans already long prepared become actualities.

Labour, too, is a difficult matter, but only in regard to its supply, for an excellent relationship exists between the trade unions and management.

Although the total force for the industry increased in November to 360,900 compared with 347,800 at the like period in 1947, there is still a shortage, particularly of highly trained personnel.

This problem, together with shortages of certain materials, is one which the industry is tackling energetically with hopes of a solution in the not too distant future.

One of the other matters which called for urgent attention was the incidence of purchase tax on drugs and medicines. That they should be taxed was considered inequitable, as it has been a recognised principle of the application of purchase tax that necessities of life such as food and utility clothing should be tax-free.

Accordingly, a strong protest was made in March to the Chancellor of the Exchequer, and the executive is glad to report that a part-way concession was announced in the Budget. The Chancellor abolished the tax on all drugs and medicines except those sold under a proprietary name or mark.

The committee was not satisfied, however, that this decision was in the best interests of the industry or the consumer, as a registered brand or name is a guarantee of quality and purity—a matter of the highest importance in regard to pharmaceutical products.

Despite further pressure the Chancellor refused to concede this point, and endeavours will continue to be made to see this anomalous decision is rectified.

During the year, the executive gave careful consideration to draft regulations concerning the conveyance of inflammable liquids and dangerous substances, and it is understood that the operation of these measures has been postponed pending the solution of various difficulties.

Chemical Production and Consumption

Continued Expansion in October and November

PRODUCTION and consumption levels of basic chemicals and non-ferrous metals were generally maintained in October and November, and in several instances showed appreciable increases over recent months and the corresponding months of 1947, it is revealed by the figures published in the *Monthly Digest of Statistics* (No. 36, December, 1948). The same applies to existing stocks. The table below has been compiled from the published statistics.

A combined figure covering the estimated numbers employed in explosives, chemicals, coke ovens and by-product works in October is given as 244,300 (168,600 men and 75,700 women). This shows a slight increase over recent months and the numbers employed a year previously. The figure for employment in the oils, greases, paints, varnish, etc., industries in October is given as 119,300 (82,700 men and 36,600 women). This also represents a slight increase.

	October, 1948 Thousand tons			October, 1947 Thousand tons		
	Production	Consumption	Stocks	Production	Consumption	Stocks
Sulphuric acid	133.8*	136	—	120.7*	127	—
Sulphur...	—	24.0*	71.6*	—	20.6*	55.1*
Pyrites	—	19.5*	66*	—	17.9*	67 *
Spent oxide	—	16.7*	166.8*	—	15.8*	161 *
Molasses (cane and beet)	53.2	30.7†	233.1	41.5	35.7†	183.2
Industrial alcohol (mil. bulk gal.) ...	2.15	2.84	8.96	2.41	3.29	8.05
Superphosphates	18.2	20.3	—	17.5	20.8	—
Compound fertilisers	147.1	121.1	—	152.3	117.9	—
Liming materials	—	526.6	—	—	467.2	—
Ammonia	—	6.77*	5.54	—	6.05*	3.91
Phosphate rock	—	89.5	180.3	—	78.7	159.2
Virgin aluminium	2.41	14.5	—	2.42	16.9	—
Magnesium	0.33	0.41	—	0.25	0.41	—
Virgin copper	—	31.3	120.8	—	38.4	104.4
Virigin zinc	—	18.3	55.4	—	21.7	33.7
Refined lead	—	18.1	13.6	—	19.3	39.3
Tin	—	2.01	17.8	—	2.88	15.6
Zinc concentrates	—	12.9	30	—	14.7	65
Pig iron	185*	—	274*	166*	—	232*
Steel ingots and castings (including alloys)	303*	—	1003	273*	—	.789
Rubber: Waste collected	0.11‡	0.63‡	4.1	0.03‡	0.82‡	44.4
Reclaimed	0.43‡	0.34‡	4.25	0.46‡	0.41‡	4.57
Natural (including latex) ...	—	4.68‡	62.6	—	3.54‡	137.6
Synthetic	—	0.05‡	2.16	—	0.05‡	2.44

* November. † Distilling only. ‡ Average of 5 weeks.

SCOTTISH INVESTMENTS

THE oil, colour and chemical industries in Scotland received a greater volume of new capital in 1948 than in 1947, with £603,500 against the 1947 figure of £352,400. This increase was against the general run of investment trends, which revealed a decrease in the amount invested last year as against the previous year by nearly £2.5 million.

Among the major companies involved in the year's flotations were Duncan Flockhart & Co., Ltd. (£130,000); Patersons (Clensel), Ltd. (£120,000); Wilson, Blackadder & Co., Ltd. (£50,000); Peter Pan Associated Research, Ltd., Aberdeen (£50,000). The present position is that the post-war registration peak has apparently passed, the 1947 figures standing at a record high level of £13,940,722 and the 1948 total at £11,480,490.

TURKEY'S 5-YEAR PLAN

TURKEY'S new five-year development plan, which covers transport, agriculture, industry, mining and electrical power, will require a total investment of £T2 billion, excluding ERP aid. It is to be financed by taxation, internal loans, profits from State enterprises and by foreign credits. Production of marketable coal and lignite is to be doubled, while that of iron ore will be increased to 250,000 tons yearly. The plan also proposes the construction of coke ovens and the improvement of port and rail facilities in the coal mining areas. The net return from chrome and copper mines is to be increased as well. Three large power stations are to be built, two with a capacity of 60,000 kW and one with 24,000 kW.

CONTROLLING GERMAN DEVELOPMENT

Security Board to Supervise Science and Industry

A MILITARY Security Board, directly responsible to the three Commanders-in-Chief of the western zones, has been established to prevent the revival of militarism and the creation of a war potential in Western Germany.

The board at present consists of representatives of the three occupying powers, Britain, France, and the U.S.A., but it is expected that later members of the Benelux countries will participate.

The duration of the board's existence is not specified, but it is expected to continue after the end of the occupation. Its terms of reference indicate that it is not to restrict unnecessarily the peaceful economic and scientific development of Germany, but is to constitute an essential safeguard for all the nations concerned. It is hoped to ensure that Germany's participation in international co-operation, is not deflected from peaceful aims by the re-birth of a war potential.

Inspections will be carried out and appropriate recommendations made to the Military Governors to ensure that scientific research is not directed to warlike ends, and that in the construction and operation of merchant shipping and the operation of civil air lines no war potential is created, also that any military building, structures, laboratories, and all shipyards or factories capable of producing armaments which may be retained, are used only for peaceful purposes.

The prevention of infringements by the Germans of restrictions in respect of certain industries will also be one of the tasks of the board.

From time to time the board will advise on any revisions necessary for the prohibition of and limitations on capacity or production imposed on German industries, and it will collect, centralise and keep up to date full information on the elements which might constitute a war potential in scientific, industrial, and military fields.

A commission representing the three Western Powers is at the head of the board which has its headquarters at present in Berlin, but will be established later in Western Germany, probably in the French zone.

Divisions will be established with wide powers to deal with scientific, industrial, and military research.

It is foreseen that the maintenance of the board will require the permanent services of a considerable number of authorities from science and industry. It is expected, for example, that there will be set up a central staff of not fewer than 75 and possibly of 200. These figures are likely to be revised and possibly increased in the light of experience when the actual duties of inspection and supervision are undertaken by the new authority.

Further Limitation of Dismantling Programme?

FURTHER revision of the programme for the dismantling of German industries is foreshadowed by a report prepared by the advisory committee of the Economic Co-operation Administration, which has been sent to the State Department, Washington.

Under the ECA Enabling Act, the report must go to the State Department, so that the Secretary of State may negotiate over the retention of plants with the other nations involved. The report is therefore to be kept secret until such consultations have been completed. This may take some time, however, as there are reasons to expect that both Britain and France will object to some of the report's recommendations.

The retention of enough steel-producing capacity to increase German production from 10.7 million tons to approximately 13 million tons is reported to be likely, states *The Times* correspondent in Washington. A figure of some 15 million tons had been mentioned speculatively during the recent weeks.

Among plant in Western Germany recently designated for allocation as reparations is that of Remynolwerke, at Bendorf, a lead factory and the Knoll alkaloid plant at Ludwigshafen.

Agreements were recently concluded by Vacuum Oil Company and Standard Esso Company with the Gelsenberg Benzin A.G. and the German subsidiary of Royal Dutch-Shell, by which the synthetic oil plants at Gelsenkirchen and Wesseling will be used for producing carburants. Production of synthetic carburants was recently resumed at the Luetzendorf plant, where tests are now taking place on the production of edible oils from synthetic paraffin wax.

The German Economic Commission proposes to increase rayon production at Schwarza, Thuringia, from 14,000 tons in 1940 to 18,000 tons in 1950.

Reviving Production in the Western Zones

Large Increase of Some German Basic Chemicals

PRODUCTION statistics and market reports for the past few months bear witness to rapid recovery in the chemical industries of the Anglo-U.S. zones of Germany. In September and October the output of potash salts and phosphatic fertilisers was almost twice as large as the average of 1947, and production increases varying between 70 and 85 per cent were indicated for sulphuric acid, soda carbonate and caustic soda.

Rather less favourable was the situation with regard to calcium carbide and chemicals dependent on the supply of hydro-electric power in general, which suffered a setback towards the end of 1948 because more electricity was required for other purposes.

More Rayon and Paint

Among chemicals-consuming industries particularly rapid progress has been made by rayon factories, which in some parts of the Anglo-U.S. zone trebled their output compared with 1947; paint manufacturers also achieved output increases of more than 50 per cent.

In view of the greatly improved supply of raw materials and fuel, further big production gains are anticipated for the current year.

Reviewing the past year, President W. A. Menne, of the Trade Association for the Chemical Industry has, however, described the achievements of 1948 as " only partially satisfactory." With the exception of certain pharmaceutical factories, which were facing a sales crisis of threatening proportions, and the nitrogenous fertiliser and insecticides industry, which was suffering from seasonal output fluctuations, expansion of production had been considerable in some parts of the industry, but it was still obstructed by recurring electricity cuts, and coal supplies had not kept step with the growing requirements.

As more coal had to be made available for chemical bulk production, deliveries to the medium-sized and small firms in the manufacturing sections of the chemical industries remained insufficient. Imports of raw materials had improved, but not quickly enough, and there was still a serious shortage of oils and fats, said Mr. Menne.

Like other German spokesmen, the president criticised the dismantling policy. The chemical industry was threatened with the loss of important suppliers. Dismantling of works in the heavy industries endangered the operation of the synthetic oil and fatty acid plants. In North Rhine-Westphalia alone more than 200 reparations claims had been registered against the chemical industry.

Regarding exports, he compared the chemical share in pre-war German exports of 15-18 per cent with the 4 per cent which chemical products contributed to exports from the Anglo-U.S. zone during 1947, and concluded that the limits set to exporters were still far too close.

Compared with pre-war days, German chemical production is still not large. In Hesse, centre of important fine chemicals, dyestuffs and pharmaceuticals factories, chemical production is now reported to be operating at 46 per cent of the pre-war level. In Württemberg-Baden, on the other hand, chemical production in October was only 4 per cent below 1936. For the whole Anglo-U.S. zone, chemical production is given as 75 per cent of 1936.

The nitrogen plant of Ruhrchemie AG at Oberhausen-Holten set up a new post-war record with an output of about 2900 tons in November last, and the catalyst plant of this company is meeting the needs of the two Fischer-Tropsch plants which have been reopened at Castrop-Rauxel and Wanne-Eickel.

Eastern Zone

In eastern Germany, little has been said about progress in the chemical industry. Considerable publicity is being given to the arrival of phosphates from Holland, apatite from the Kola peninsula, pyrites from Norway and some other materials from eastern countries, but the chemical industry was not mentioned among those which succeeded in meeting their production targets for the second half of 1948.

A " productivity " competition has been arranged between the Agfa works at Wolfen, the buna works at Schkopau, the nitrogen plant at Piesteritz, and the chemical works at Leuna. These plants are mentioned in the Press of the Soviet zone from time to time, while other formerly famous plants are no longer mentioned and are assumed to have been dismantled.

The loss of iron and steel due to the counter-blockade by the western zones of Germany has compelled the economic authorities to give priority in coal and lignite supplies to the local steelworks, with the result that less fuel is at present available for chemical factories. Of these the " publicly-owned " undertakings now account for substantially more than half the total chemical production.

Bid for Nationalisation

Conference on Chemical Industries

EVIDENCE that officials of the Chemical Workers' Union and affiliated labour organisations interested in chemical production consider the time ripe to pursue demands for nationalisation of chemical industries was provided at a meeting in London on January 14, which was attended by the President of the Board of Trade (Mr. Harold Wilson) and the Economic Secretary to the Treasury (Mr. Douglas Jay).

No report has been issued of this meeting, held privately in Transport House, but it is assumed that the purpose and procedure were the same as those of other meetings which latterly have been held by sub-committees of the Labour Party and the TUC in collaboration with officials of the appropriate labour organisations.

Among those taking part in this last meeting were Mr. R. Edwards (secretary of the Chemical Workers' Union), Mr. Arthur Deakin (general secretary of the Transport and General Workers' Union, which conducts large-scale negotiations on behalf of chemical workers), Mr. Tom Williamson (general secretary of the General & Municipal Workers' Union), and the general secretaries of the Iron & Steel Trades Confederation and the Building Trade Workers' Union.

The meeting was one of a series which has been in progress for some time, designed to examine the prospects of extending State control over a number of industries now independent.

The recommendations of all such meetings will require to obtain the approval of several Labour Party committees and of the annual Party conference before nationalisation of the industries concerned is officially adopted as General Election policy.

LIVING DETECTORS

SCIENTISTS of the American University of Wisconsin are making use of the fact that minnows can be trained to detect small concentrations of industrial waste products in water, states a scientific correspondent of the *Financial Times*. Training consists of teaching some fish to expect food when a certain polluting material, phenol for example, is placed in the water, and others to fear an electric shock if they venture into the feeding place where the water is contaminated.

By observing the distribution of minnows, small concentrations of polluting material can be detected more rapidly than by any known chemical method, it is stated.

German Chemical Index

First Comprehensive Work Proposed

WORK in co-operation between the Association of British Chemical Manufacturers and the Board of Trade has been in progress for some considerable time at the Technical Information and Documents Unit of the Board of Trade on the production of a card index of information relating to German chemical industrial processes. This is intended to serve as a guide to reports published under the auspices of the Combined Intelligence Objectives Sub-Committee, the British Intelligence Objectives Sub-Committee and the Field Intelligence Administration Technical (CIOS, BIOS and FIAT) as a result of visits to German industry by technical teams.

In 1949 H.M. Stationery Office is prepared to arrange for the reproduction and sale of the index, provided a guarantee can be given that a substantial number of copies will be purchased by industry and others. It would present information regarding products in alphabetical form, and would occupy seven volumes, and cost five guineas for the set.

The work of indexing the large mass of captured German documents is still proceeding and a supplementary index covering these will probably be published later.

The card index may be seen at the Technical Information and Documents Unit, Board of Trade, German Division, 40 Cadogan Square, London, S.W.1, and the ABCM is now collecting name of those who wish to buy a set of volumes.

NUCLEAR FUEL

ATOMIC power in a form suitable for industrial purposes is likely to be experimentally produced in Britain in 1950, in the opinion of Sir Wallace Akers, a director of Imperial Chemical Industries and a former director of British atomic research, who lectured before the Society of Chemical Industry at Trinity College, Dublin, on Monday.

It was probable that an experimental power-producing reactor would be operating next year, said Sir Wallace Akers. It was too early to state the cost, although it seemed likely that eventually the capital and working cost would be reduced sufficiently to enable uranium and thorium to compete with other fuels where the latter involved heavy transport charges.

The lecturer said the new reactor would reduce the speed of fission neutrons from 50 million miles an hour to about 5000 miles an hour. The experiment next year would be carried out in America.

Steel Achievement

All Estimates Exceeded in 1948

STEEL produced in December, equivalent to an annual output of 14.678 million tons, helped to raise the total output for 1948 substantially higher than the level sought in the Government's objective of 14.5 million tons announced in May.

The British Iron and Steel Federation, announcing the excellent record, reveals that the total output in 1948 was 14,877,000 tons and recalls that in January, when the year's original target was set by the Government at 14 million tons, it was felt by them to be barely attainable. 14,877,000 tons is by far the highest annual output reached in the history of the industry, being more than 2 million tons higher than 1947. The best previous year, 1939, was 13,222,000 tons.

The year ended with a record December, thus rounding off a year in which each month except July, which was affected by holidays, showed a record performance by the industry, as compared with any year.

Raw material supplies, says the federation, are again likely to be the main factor affecting performance during the coming year.

The following table compares the Economic Survey forecasts for 1948 with the actual outcome for the year. This shows clearly that expanded scrap supplies have enabled this high steel production to be attained.

Thousand tons	Forecast (Econ. Survey)	Performance
Steel ingots and castings production	14,000	14,877
Scrap—home bought (receipts)	3,700	4,550
Scrap—imported (receipts) ...	850	800
Pig iron production	9,200	9,276
Coke (excluding foundry and gas coke)	10,348	10,420

SCOTTISH PRODUCTION

SCOTTISH steel producers finished a highly productive year with an output in December equivalent to an annual rate of 2,398,600 tons of ingots and castings, giving an actual output for the year of 2,253,900 tons. This susbtantially exceeds the previous record of 2,074,400 tons set up in 1920. In 1947, 1,878,900 tons were produced, and on only two previous occasions —in 1940 and 1943—was the 2 million tons level reached.

Pig iron production for the year also reached high levels, the total for the year amounting to 765,700 tons, compared with 592,200 tons in 1947. In the last 28 years the 1948 output was exceeded on only two occasions—in 1923, when 768,500 tons was produced, and in 1920, when the record of 902,500 tons was set up.

Anglo-Polish Agreement

£130 m. Exchange in Five Years

THE President of the Board of Trade has announced the conclusion in Warsaw of a five-year trade and finance agreement with Poland, and of an agreement for the release of Polish property in the United Kingdom and of British property in Poland.

The agreement foresees an exchange of goods up to the end of 1953 to the value of about £130 million each way, Poland to supply foodstuffs and timber on an increasing scale and to receive raw materials and manufactured goods including capital equipment. Poland will obtain supplies of wool, rubber, crude oil, semi-manufactured copper goods, tyres, dyestuffs, and other goods, besides capital equipment. Poland will receive export credit guarantees.

Talks are to begin in London next month about compensation for British interests whose property has been nationalised and about all forms of Polish pre-war indebtedness. Towards meeting such claims, Poland will make certain payments on account from sterling which she will receive from releases of Polish property in the United Kingdom, and which is expected to amount by the end of 1950 to approximately £500,000.

B.I.F. EXHIBITORS' COUNCIL

THE council of exhibitors for this year's British Industries Fair includes the following members and their representation :—

Chairman : Mr. G. S. Owen, C.B., Under Secretary, Board of Trade, Export Promotion Department.

Chemicals : Mr. A. J. Holden, Association of British Chemical Manufacturers. Chemists' supplies : Mr. C. A. Williams, Toilet Preparations and Perfumery Manufacturers' Federation, 69 Cannon Street, London, E.C.4. Pharmaceutical Export Group : Mr. W. J. Williams, Pharmaceutical Export Group, Tavistock House South, Tavistock Square, London, W.C.1.

Glassware (Glass Manufacturers' Federation, London) : Mr. H. S. Williams-Thomas (Stevens & Williams, Ltd., Brierley Hill Glass Works, Staffs.).

Plastics (British Plastics Federation, London) : Mr. W. C. Waghorne (Insulators, Ltd., Leopold Road Works, Edmonton, London, N.18). Pottery and stoneware (British Stoneware Manufacturers' Association) : Mr. L. Attenborow (Lovatts Potteries, Ltd., Langley Mill, near Nottingham).

Scientific instruments (Scientific Instrument Manufacturers' Association, London) : Mr. T. J. Offer (C. Baker (of Holborn), Ltd., 244 High Holborn, London, W.C.1)

Industrial Drying Processes

Chemical Engineers Review Contemporary Methods*

WITHIN the last decade or so has been developed a new technique of freezing materials to be dried before drying them by sublimation of the ice in high vacuum. Normal working pressures are 0.1 to 0.3 mm of mercury, temperatures are $-10°$C. to $-30°$C. Water vapour may be removed by refrigerated condenser, absorption in a dessicant or by pumping. Heat of sublimation may come from the material being dried or from the walls in smaller units, but more usually from a thermostatted heater. In the latter case, care is taken never to melt the solid.

Sublimation of the ice begins at the surface of the solid, then the ice surface gradually recedes into the body of the material, leaving a rigid porous honeycomb structure. This permits ready diffusion of water vapour and results in a substantially constant drying rate.

In addition to the best-known advantage of avoiding damage to heat-sensitive materials, the process avoids shrinkage of material and yields a product which readily re-dissolves. It prevents any high local salt concentration at the surface which is sometimes produced in ordinary vacuum dryers.

Two Stages

Usually 98-99 per cent of the total water is removed by such process, the temperature is then allowed to rise to room temperature or higher and moisture is reduced to 0.5 per cent. The rate of heating is controlled to give the highest possible water vapour pressure at the ice surface without danger of melting the material. The product tends to be hygroscopic and demands appropriate packaging precautions.

Anti-biotics, plasma and sera are dried in their final ampoules, and then sealed. These materials may be frozen with the ampoules rotating so that a shell of frozen material is built up. Thus as drying proceeds from the central core the surface area increases and so does the drying rate. With appropriate precautions, auto-freezing may be carried out, relying on the fall in temperature due to rapid evaporation of water and using no auxiliary refrigeration.

Rate of evaporation and costs vary enormously with different materials and methods of treatment: for instance freezing in ampoules means that there is high resistance to vapour flow due to the long thin stems.

Nevertheless, Flosdorf in *Chem. Eng. Progress* 1947, *39*, 1064 has given the following figures for sera containing 10 per cent solids under average conditions.

With the material at a temperature of $-18°$C. the ice surface recedes at the rate of about 1 mm. per hour. Drying proceeds at a constant rate until all the ice has gone: this requires about 80 per cent of the total drying time and removes about 95 per cent of the total water present. In 90 per cent of the total drying time the moisture content of the product is usually reduced to about 1 per cent and the remaining 10 per cent of the time is required to reduce the moisture to less than 0.5 per cent.

Costing

In the manufacture of expensive biological and therapeutic materials the cost of drying is not an important item, the freeze drying is adopted to achieve results which could not be obtained in any other way.

In the application of this method to foodstuffs, however, cost is a major consideration. The cost appears to be about threepence per pound of water evaporated. It is claimed that freeze drying compares favourably in cost with spray drying at low temperatures, although it is more expensive than high temperature spray drying.

In general, however, concluded Dr. Chambers, the use of freeze-drying today is only justified for expensive products which cannot be dried without undue deterioration in any other way.

Drying Machinery

Drying may be considered as the oldest unit process in chemical engineering, said Mr. E. F. MacTaggart in opening his paper. He specifically excluded from his consideration squeeze rolls, centrifuges and filters as not being dryers from the chemical engineering point of view; he also excluded radio frequency methods, freeze drying and infra-red methods.

In general use are the following main classes of dryer:—

1. Drying racks and chambers.
2. Drying floors.
3. Tunnel or kiln.
4. Continuous tunnel.
5. Rotary.

* Summarising a day's conference organised last week by the Institution of Chemical Engineers, devoted to drying processes. Principal papers were on "Vacuum Freeze Drying," by Dr. H. H. Chambers, D.I.C.; "Drying Machinery," by E. F. MacTaggart, B.Sc., A.R.C.S.; and "Radio Frequency Drying," by R. L. Stephens, B.Pharm., Ph.C. An important later addition to the original programme was a paper by D. M. Newitt, J. F. Pearse and T. E. Oliver, on "The Mechanism of the Air Drying of Solids."

6. Film or drum.
7. Vacuum.
8. "Turbo."
9. Spray.
10. Integral grinding and drying.
11. Pneumatic.
12. Miscellaneous.
13. Gas dryers.
14. Infra-red.
15. Radio frequency.
16. Freeze.

The average dryer of today shows an extraordinary similarity in overall design with its counterpart of 50 years ago, but tends to be simpler in construction. By the use of new high temperature alloys, hot clean air can now often be used in place of the use of direct products of combustion.

Simplest Forms

Drying racks are very simple and slow but in some cases superior to more rapid systems. Drying floors heated from below are also simple and inexpensive in labour cost; in Cornwall they are extensively used but tending to be replaced by the "Turbo" dryer.

Tunnels may operate adiabatically with external heat exchangers, or may have intermediate radiators. They may be made of a wide range of materials and usually have large volumes of air passing through them. Rails are set into the floor to take the bogies on which the goods are carried and airtight doors close each end.

In the drying of ceramic ware the action of infra-red radiant heat has been successfully combined with convection methods for drying. The drying cabinet works on much the same general principles as the tunnel dryer.

Handling costs are greatly reduced by continuous tunnels using endless chains, belts or rollers. Of these, one of the most highly developed is a multi-tier machine for drying veneers and building boards. Heating pipes are fitted above and below each tier for uniformity in heating. Air passes from side to side of the dryer, progressing from one end to the other. Often, a relatively high humidity is needed in the first stages of drying to prevent case-hardening and cracking.

Rotary driers consist of developments from a mild steel shell mounted on trunnions, driven by a girth wheel and pinion, one end fitting into a furnace while the other is connected to a fan or chimney. To reduce heat losses two concentric cylinders have been used; to increase capacity and rate of drying lifters (usually cruciform) have been fitted to expose fresh surfaces to the hot gases. For very high temperature work such as calcining of gypsum, the whole drum may be run inside the brickwork of a furnace.

Viscous liquids and those containing a comparatively small amount of solid matter cannot usually be treated by any of the foregoing methods. In its simplest form, a film dryer consists of a hollow cylinder, heated internally by steam, the lower segment dipping into a trough of the feed liquor. When the drum is rotated, liquid is picked up, water evaporated and solid removed by a doctor blade.

To overcome difficulties, due to very high or very low viscosity or to excessive slowness of evaporation, two-stage film dryers or partial jacketing of the rollers with passage of a warm air current have been tried. A combination of vacuum and film dryer has also been put on the market.

For drying of heat-sensitive, easily oxidisable or dense, sticky materials, vacuum dryers have great advantages. Usually these are tray-type and operated batchwise, but continuous band processes have been devised despite the obvious practical difficulties of sealing and maintaining the vacuum.

Spray drying—which, contrary to the popular belief, is over 75 years old—is applied particularly for heat-sensitive materials. Early spray and drum driers were mostly concerned with milk and prone to fail because of the difficulty of producing a powder of regular particle size. Progress occurred after various rotating disc or hood systems for "atomising" the liquid replaced earlier injector methods.

"Turbo" Method

Sticky material is well-handled by the so-called "Turbo" dryer. The wet material is fed in a thin layer on to the upper member of a series of annular shelves, each made of a number of segmental plates with slots in between them. The shelves rotate and after passing through about 90° pass under a stationary transfer arm which scrapes the material off the segment through a slot on to the shelf below.

Surrounding the shelves is a bank of steam-heated tubes or electric radiant elements, while the central axis of the dryer carries three or more fans which cause the hot air to flow over the shelves radially, the wet air being eventually discharged to atmosphere.

Integral drying and grinding may be carried out in a ball-mill or with ring-roll mills, in some cases using temperatures well over 100°C. So-called pneumatic drying consists of drying the wet material by introduction into a rapidly moving stream of air. Dry powder is then collected in a cyclone separator. Only light granular substances may be dried by this means.

Water-vapour may be removed from air

(*Continued on page 156*)

VERSATILITY OF CARBON

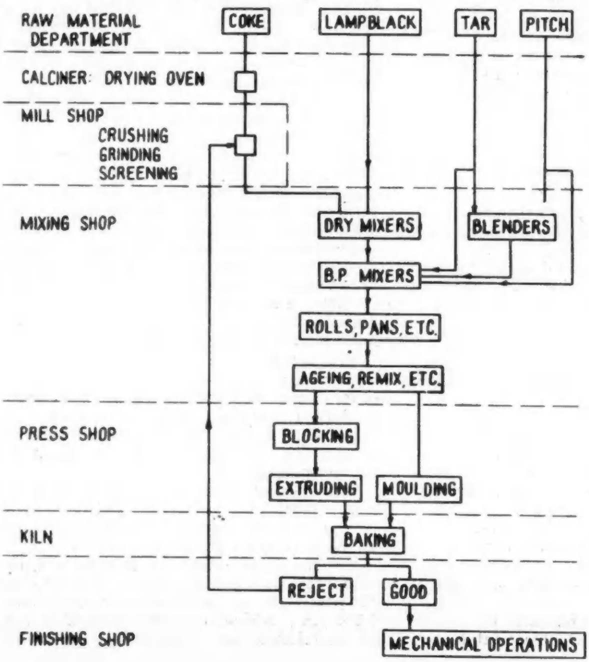
Basic Properties of Some Graphite Forms

A EULOGY of the multiplicity of services rendered by carbon in one form or another formed the introduction by Dr. H. K. Cameron, F.R.I.C., to his lecture on "The Manufacture and Uses of Carbon," given recently to the London Section of the Society of Chemical Industry. Here is an element, he said, which can form the hardest material or a lubricant; it can have a brilliant lustre or be used as a dull black pigment; it may be used as a good conductor or as a resister, for its chemical inertness or its chemical activity.

As the diamond 75 per cent of its consumption is industrial and it is interesting to note that the first patent for the use of the diamond in dies is dated 1819.

As graphite, its main characteristic is its cleavage which makes it suitable as a lubricant. Because of its conductivity it is used in conducting points—for instance, inside cathode ray tubes. Moulded parts (electric motor brushes) derive from graphite.

Sources of carbon components



Amorphous forms are grouped under cokes (from coal or bitumen), chars (for sorption and clarification) and soots. The last-named may be obtained by burning gases or oils in insufficient air. By adjustment of conditions different shapes, sizes and forms of aggregation of the blacks are obtainable. Rubber industry, the main consumer, calls for over half a million tons per year, more than 33 per cent by weight of pneumatic tyres being carbon black.

For the manufacture of electrodes the selected powder is ground, calcined if necessary and kneaded with a binder. This retains the powder on mixing, acts as a lubricant on extrusion and has to provide a high coke residue on final baking. Relatively short electrodes may be compression moulded; otherwise they are extruded, small diameters from horizontal presses, larger ones from vertical.

Baking is carried out in ovens built on the ring principle, most frequently the Hoffman Ring furnace. The electrodes are packed in carbon dust. To obtain the best mechanical properties the tar binder needs to be converted to coke. Hence the temperature is raised gradually to 600-700°C. to give maximum cracking and minimum distillation. To give the other desired properties—such as electrical resistance within specified limits—higher temperature firing, to 1200-1300°C., is necessary.

For the manufacture of brushes the process is essentially similar but the main carbon source is graphite. Where the proportion of metal blended in is over 50 per cent, manufacturing and sintering techniques of powder metallurgy are used.

Usually a temperature of 2500°C. is required for the graphitisation of graphite

components. It is important to avoid over-graphitisation as this leaves the parts more vulnerable to chemical attack than when correctly fired. Some eddy current heating is done, but more usually electrical resistance heating is used. Large furnaces are built afresh for each firing.

Energy Consumption

Silicon carbide is used as the refractory insulator and energy consumption varies between 2½ and 3½ kWh/lb. charge, depending largely on the size of the charge.

During firing, amorphous carbon is transformed to approximately graphitic form.

There is an increase in crystalline character and in parallelism of planes, with development of strong bonds within the plane. Probably the hexagonal forms are already present in the amorphous material, and they re-group on heating.

X ray spectrograms of the powder heated to various temperatures in the range 1000-2000° C. show a very clear picture of more and clearer lines with increasing temperature. There is also a slight shift of the lines with temperature.

Graphitisation of carbon can be achieved at temperatures lower than 2500° C., for instance, by crystallisation from iron or by cracking carbon monoxide at 900-950° C. Also carbon obtained from the vapour phase by sublimation is rather graphitic and more uniform than that obtained by milling. But this is not a commercial proposition.

Properties of carbon which make it so valuable industrially may be listed as follows :—

1. Refractory character. Carbon has no melting point, asserted Dr. Cameron, but eventually sublimes on heating.
2. Chemical inertness to all but oxidising agents.
3. Low thermal expansion and high resistance to thermal shock.
4. Good heat conductivity; as graphite, its conductivity is the highest of all non-metals.
5. Good electrical conductivity.
6. Self lubrication, in graphitic form. This makes it valuable where lubricants would be harmful (*e.g.*, in bearings in chemical and food plant).
7. Good machining properties.

New developments in carbon arcs have resulted in the attainment of light intensities of 2000 candles/mm²—greater, that is, than that of the sun, which is variously estimated as 1650-1800 c.p. This has been achieved with special electrodes at a current of 200 amps d.c. In an argon atmosphere the carbon arc has special advantages for aluminium welding.

New Development

Results of recent investigations on the lubricating property of graphite suggest that a surface water film on the characteristic graphite structure as base is most important. When this is destroyed, as at high altitudes below freezing point, heavy wear occurs.

One final new development mentioned was that of the Leclanché cell which depends on air for depolarisation.

INDUSTRIAL DRYING PROCESSES

(*Continued from page* 154)

(as for air-conditioning) by refrigeration or by adsorbent such as activated alumina, silica gel or calcium chloride.

The speaker offered the following figures for steam consumption of different types of dryer :—

Type	lb. steam/lb. water evaporated
Vacuum	1.1—1.8
Pan	1.5—2.5
Film	1.2—2.1
Spray	1.1—1.7
Tunnel	2.2—3.1

Radio Frequency Drying

Radio frequency drying, said Mr. R. L. Stephens, B.Pharm., represented a drying process in which the majority of the heat of evaporation is supplied by means of electrical energy at frequencies between 1 megacycle and 100 megacycles per second, *i.e.*, in the wave bands associated with radio communications.

Frequencies of this order are produced by valve oscillators and the material to be heated is made to form part of a tuned circuit. Heat produced as dielectric and resistance losses is used for drying purposes.

From the first simple arrangement of one pair of electrodes have come many developments. Material may, for example, pass between a sequence of electrodes increasing in area and spaced more closely as the material dries; or successive electrodes may have a rising voltage across them.

In dielectric loss heating the drying conditions are very different from those in other forms of heating because the heat is generated within and throughout the material. Limitations of the method are well shown by attempts to dry gelatine—which boils up into froth.

Only porous substances can be dried by this means. Thus clayware, viscose rayon, filter cakes and penicillin in ampoules have all been successfully handled.

Mr. Stephens calculated that in a typical case, the drying of a product containing 33 per cent of water would cost about 0.63d./lb., taking the efficiency of a large r.f. installation as 50 per cent.

DEPRECIATION AND MAINTENANCE—VI

Fixed Assets and Balance Sheet Values

by S. HOWARD WITHY, F.Comm.A.

THE sources of deterioration of chemical plant are manifold, apart from the effects of wear and tear and the obsolescence involved by the advances in technology, engineering and science.

Equipment is also subject to constant serious attack from the atmosphere or from water, and for many years the factor of corrosion has been of very considerable importance to chemical engineers.

While the progress of corrosion of the staple material from which chemical plant is made can sometimes be arrested by natural or artifical protective layers, effective protection is extremely difficult to ensure if the corrosive product is fully soluble. Severe attack often occurs in tanks and where debris has been allowed to accumulate on the metal surfaces of machinery. Even in dry conditions, electrochemical action often takes place, and corrosion may be hastened by the pollution of the atmosphere by solids or gases.

Heightened Endurance

Resistance to abrasion, creep, heat and shock very often determines the length of life of a section of plant in spite of the fact that steels of the chromium-nickel austenitic type now offer remarkable resistance to certain chemical agents and that other materials now being used for plant confer equivalent advantages. Manganese steel possesses extraordinary resistance to abrasion and shock and has an unusually high work-hardening capacity; and for the purpose of withstanding almost any deteriorating influence alloy steels are now being applied to many parts of capital equipment where hitherto carbon steels had been used. The aid offered by the numerous alloys is fully appreciated by engineers, but there remain a number of purely local factors affecting the computation of depreciation in the capital values.

Comparatively rarely do the circumstances justify the user of chemical plant in deciding that the schedule of agreed wear and tear allowances provide an adequate measure of allowance for depreciation.

Some who handle plant seem to assume that the owners have unlimited resources for replacement. It must be said however that there are signs that the majority of employees in the chemical and chemical engineering industries have changed their views in this regard.

But volume of use and type of operator are important factors, and in the chemical industry it is impossible to lay down any hard and fast rule for the writing down of book values. New techniques and different processes frequently render obsolete not only single units of equipment but entire works layouts, and the steep rise in replacement costs accentuates the difficulties in making adequate provision in the accounts.

Rising Costs

Provided the purchasing power of money does not change, company directors are usually able to pursue a conservative policy which withholds funds from present use in order that the fixed capital employed in the business shall be replaced to guarantee continuity of output and employment. This need for creating and building up reserves is common to all users of chemical plant. Any rise in the cost of capital goods, however, makes it more difficult to provide adequate reserves for the acquisition of new plant and may make it impossible for many firms to take advantage of improvements in plant design and construction.

The rise in the general price level that followed World War 1, while very costly to industry, enabled some chemical and engineering companies to earn high paper profits, and a considerable proportion of these higher earnings was ploughed back for the purpose of maintaining, and in some instances increasing, the physical volume of productive capital. Although prices rose generally, the assets of industry were well maintained. The change in the purchasing power of money brought its own natural correctives, and company reserves and forward balances expanded.

Earnings and Taxation

While prices have more than doubled since the last war, the nominal earnings which are the natural result of a lower purchasing power have been seriously restricted by the application of profit margins, controls, prohibitions and shortages.

As the consequence of the attempts to control inflation the productive agencies now find themselves unable to acquire units of modern equipment in sufficient quantities to increase the supply of consumer goods available at home and overseas, and the net profits and disposable balances of individual companies in all groups of industrial and commercial activity are still further restricted by crippling income tax and a thoroughly obnoxious profits tax.

While the floating assets of business—such

as stocks, book debts and short-term investments, etc.—are quickly brought within the orbit of changing values, it is because plant and machinery are "fixed" assets in both the physical and the monetary sense that so many misconceptions have arisen on the subject of prices, profits and dividends.

Fixed assets are still valued on the assumption that their price is fixed, and as the world is now operating on an entirely new and higher price level the owners of the fixed assets of industry are compelled to hold and accept claims to wealth that are all worth very much less than the real value of the assets in physical terms.

To the extent that the wear and tear allowances granted by the Inland Revenue are inadequate it will be difficult for users of plant to find the resources to replace their fixed assets without drawing on other essential reserves. British income taxation has unfortunately never been framed with recognition that industrial capital must be maintained.

Whether the maintenance of fixed assets is the responsibility of directors and the owners of the capital, or whether it is the duty of the Government to see that sufficient commercial credit is available to enable companies to develop in a planned direction, the fact remains that at present many users of chemical plant possess insufficient undistributed profits to enable the fixed assets worn out in the process of earning taxable profits to be renewed.

Higher Replacement Charges

In some of the trades associated with the chemical industries, a good deal of the profit-earning equipment now being used is extremely efficient as far as endurance and reliability are concerned. Many old installations and sections of plant are still capable of withstanding high pressure and maximum operation in the attainment of targets; in fact, the less reliable units of machinery have long since been discarded, but the annual cost of maintenance, including cleaning, overhauling, repairing, adjusting and renewing parts and accessories, etc., is rapidly expanding. Concurrently periodical increases in the costs of labour and essential materials, following wage awards to certain sections of industry, will doubtless compel manufacturers of spares to continue to raise the level of their prices.

The general position today is that it takes nearly three times the amount of capital to finance the same quantity of production as before the war, and the replacement value of pre-war plant and other fixed assets is directly related to the rise in the cost of capital goods. As the latter is available in the form of an index number there is no valid reason why the wear and tear allowances should not be increased.

This could be done by applying the rates to the replacement value, instead of to the reduced book value of the plant; but unless this was made retrospective the benefit to the chemical industry would be largely illusory.

An Example

If, for example, the current index of cost of capital goods is 300, as compared with 100 in 1939, the existing book value of the taxpayer's plant could be increased by 200 per cent and the prevailing allowance applied to this new figure. Such computations could form an integral part of each year's income tax assessment and could be shown in the manner indicated below:—

		£
Invoiced cost of plant in 1939		20,000
Estimated residual value in 1952		1,100
Amount to be written off over period of 13 years		£18,900
Wear and tear allowances at 20 per cent per annum based on diminishing book value—	£	
1940 ...	4,000	
1941 ...	3,200	
1942 ...	2,560	
1943 ...	2,048	
1944 ...	1,638	
1945 ...	1,311	
1946 ...	1,049	
1947 ...	838	
1948 ...	671	
1949 ...	537	
1950 ...	430	
1951 ...	343	
1952 ...	275	£18,900

The annual allowance in this case has declined from £4,000 in 1940 to £275 in 1952, during which period the cost of replacement has steadily increased. As the replacement value of the plant is £60,000 (£20,000 × 3), the wear and tear allowances based on this figure would be £56,700, and the residual value of the plant would be £3300.

In other words, to enable the necessary funds to be secured for the acquisition of new plant in 1952 the taxpayer should be granted supplementary allowances totalling £37,800 over the next four years, equivalent to £9450 per annum. This is demonstrated by the following calculations based on replacement value:—

Replacement value of plant acquired in 1939 ...		£60,000
Wear and tear allowances at 20 per cent per annum based on diminishing book value—	£	
1940 ...	12,000	
1941 ...	9,600	
1942 ...	7,680	
1943 ...	6,144	
1944 ...	4,914	
1945 ...	3,933	
1946 ...	3,147	
1947 ...	2,514	
1948 ...	2,013	
1949 ...	1,611	
1950 ...	1,289	
1951 ...	1,031	
1952 ...	824	56,700

Written down replacement value of plant at end of 1952	£3,300
Total allowances for replacement	56,700
Total allowances based on cost	18,900
Total of supplementary allowances, 1949-1952	£37,800

= £9,450 per annum

Another method of adjustment would be for the Government to recognise the injustice that is being done to owners of fixed capital. Many accounts submitted by chemical manufacturing and engineering companies covering the past year's operations do not disclose the actual position in physical terms, although from the purely accounting standpoint the figures are doubtless correct, and a good case could be made out in support of a nation-wide and independent revaluation of fixed assets.

In a world of inflated values, industrial plant and machinery should not be pegged down to original cost when determining the allowance to be granted to the user of plant acquired before the war, and the writing-up of balance sheet values and the creation of additional capital reserves would justify a corresponding increase in the nominal holdings of the owners of the fixed productive assets. This would enable capital structures to be brought into line with the new conditions, and by making the prevailing inflation applicable to balance sheet values, would enable accounts to be presented displaying the real state of affairs.

That an increase in the amount of share capital shown on the liabilities side of a company's balance sheet, whether as the result of the capitalisation of reserves or by the issue of new script, would not cause inflation can be demonstrated by considering the case of a chemical manufacturing company which recently distributed an ordinary dividend of 20 per cent, the market price of the £1 units being then shown in the official list at £5 each.

Not Inflationary

The holder of ten of these shares would be in possession of shares worth £50, and at this price the shares would yield 4 per cent, based on a 20 per cent dividend.

The issue of one new fully-paid ordinary share for each share held would, of course, double the amount of the company's issued share capital, but as this would not affect the amount of equity profit available for distribution, the rate of dividend payable on the same disposable balance would have to be reduced to 10 per cent, and this would cause the market price of the shares to drop from £5 to £2 10s. The holder of 20 shares would then be in possession of shares worth £50, as before, and there would be no new inflation.

Apart from the fact that the writing-up of industrial capital and the capitalisation of reserves by the issue of bonus shares would automatically render unnecessary a policy of dividend limitation, the adjustment of balance sheet values would have the effect of relating equity earnings to the real capital employed, and would enable financial statements to show the actual position in physical terms.

In 1947-48, for example, the equity profits realised by chemists and druggists equalled 32 per cent, of which 22 per cent was distributed in the form of dividends and 10 per cent added to reserves and forward balances. These percentages, however, are arrived at before allowing for income tax, which at the standard rate of 9s. in the £ reduces the group earnings to 17.6 per cent, the dividends to 12.1 per cent and the undivided profit to 5½ per cent of the equity capital; and if this capital was doubled the ratios would be halved. In the case of engineers, existing accounting methods show the earnings to equal 39.2 per cent of capital, the average dividend being 16.4 per cent before tax and the balance of 22.8 being undivided. After allowing for income tax and alterations in the capital structures of the companies the ratios would probably be little more than one-quarter of these percentages.

(To be continued)

NEW FRENCH ACTIVITY

IMPORTANT quantities of carbon dioxide are to be supplied to the Saar by the Sté. Les Carboniques Liquides Réunis, whose factory at Nancy has now reached the limit of its production possibilities—almost 7.2 million kg. in 1947. The company is to increase production from 300 to 450 kilograms an hour.

* * *

The Dyr Phosphate Company is increasing its production potential of pyrites, lead and zinc by modernising its equipment, and is also prospecting an important copper seam in Morocco.

* * *

The Tunisian Phosphates Company is shortly to start production of hydrogen. At the Bordeaux Chemical Products Company, superphosphates production is increasing. Sales of manures and copper sulphate are higher than in 1939 and the insecticide branch is being developed.

* * *

Prospecting is also taking place at Senegal, signs of lime phosphates having been noted in the area.

REMOVAL OF DUST AND FUMES

Basic Considerations and Factory Practice

by C. H. SEVERN*

LET us first define the dust and fumes which we wish to extract. I think we may describe them as gases, vapours and small particles of material which are produced during an industrial operation or process. They may be a residue which must be collected or they may have merely become detached from the product of which they are part. The latter we must try to prevent.

Reasons

Secondly, let us ask ourselves what are the reasons for collecting the dust and fumes, because the answers may influence our methods of collection. We say that:—

1. They may have an economic value. Fumes may contain a recoverable industrial spirit, gas or other matter. Dust may be re-used in the product or it may be used in a by-product. In the case of precious metals, they have their own intrinsic value as raw materials.

2. This is where the safety officer is most concerned—they may form a hazard if they disperse. Dust- or fume-laden atmospheres of most materials in certain concentrations are explosive. Fumes may be inflammable or toxic and may overcome workers or affect their health. Dust and fumes may be irritant and give rise to skin diseases such as dermatitis. Dust may congest the lungs and with certain materials may cause diseases such as silicosis. Damage to sliding parts of machinery, electric motors, etc., may be caused by the abrasive action of dust. Do not ignore what appear to be very smooth harmless dusts; under the microscope they present a very different appearance.

Lastly, efficient dust and fume extraction leads to general cleanliness and improved working conditions.

Our first aim should be to try to prevent dispersal of dust into the atmosphere by careful handling of dusty material. This is illustrated by an operator handling a powdered material with an improvised scoop which is just an ordinary tin container. The lip hinders flow of material when filling or emptying; it is necessary to shake the tin to fill it and the expulsion of air creates a cloud of dust. The same operation is carried out with a properly designed scoop. It is streamlined and the open top allows unhampered air displacement and the operation is almost dust-free. Another example is a telescopic discharge chute for conveying material from a storage receiver to a container or vehicle. The chute is of circular section. The lower part is supported from balance weights and moves vertically over the upper part. The principle is that the open end of the chute rests on the heaping material, thus forming a seal at the impact of fall and preventing dust dispersal.

Where possible, use closed storage for dusty materials or provide lids for containers.

In buildings where a dusty process is carried out, it is advisable to install vacuum cleaning equipment to remove unavoidable dust accumulations. The use of a broom creates a dusty atmosphere and merely redistributes a large portion of the dust.

Coming to methods of collecting dust and fumes, the first thing to remember is to collect as near as possible to the point where they are given off and prevent dispersion into the atmosphere. Considering an ordinary laboratory fume cupboard, the operation or process is carried out inside the cupboard and there is an outlet in the back to the outside atmosphere. Heat in the cupboard will increase the ventilation by convection and the sliding door on the front may be closed. If heat is not used, or to increase the efficiency of the fume cupboard, an extraction fan may be fitted.

Inflammable Fumes

Mounting the fan motor outside the ducting avoids the possibility of dust or fumes entering the motor, and is very necessary where the fumes are inflammable or the motor must be of flameproof construction. When an exhaust fan is provided it should have a capacity such that when the fume cupboard door is open to the normal working position, the air velocity over the opening is in the region of 70 to 100 ft. per minute; much above that the operator may get a sense of draught if the area of the opening is large. A damper should be provided to enable the rate of air extraction to be regulated, otherwise when the door is nearly closed the air velocity through the opening may be so high as to disturb operations, such as deflecting a Bunsen flame.

If material to be handled is highly dangerous if inhaled, it may be possible to carry out the operation in a cupboard completely sealed from the operator who works

* Extracts from an address to the Birmingham and District Industrial Safety Group by an officer of Bakelite, Ltd.

with his arms through holes provided with flexible sleeves which fit by elastic bands at the wrist.

Any dusty operation should be carried out under a hood whenever possible and the hood should be provided with adequate means of air extraction. If access to the operating space must be maintained, the direction of air extraction should be away from the opening to keep the dust away from the operator. When access to the operation is not necessary, the machine or area should be completely enclosed with the minimum of suitably spaced openings for ingress of air only. It should be pointed out here that air is necessary to remove dust; being airborne it cannot be carried in a vacuum.

Stressing again the importance of extracting dust or fumes at the point where they are given off before they disperse into the atmosphere, we have the example of an extraction hood completely surrounding a sack or drum-filling chute. A perforated plate through which the chute passes covers the whole mouth of the sack or drum and by making even the air extraction at a lower velocity over the whole area prevents the product being taken into the extraction system with the displaced air. Where the dust is not part of the product, such as from a saw or grinding wheel, high velocity extraction is preferable.

The fume or dust hood is connected to an extracting fan. Each hood may have a separate fan or a number of hoods may be connected by a system of ducting to one fan. It is not recommended to extract damp or sticky fumes and dust in the same system, as this would result in excessive lining up in the ducts and fan casing and on the fan impeller.

Air Ducts

In the average dust and fume collecting system the ducting is of circular section and made from mild steel. The ducts may, however, be under a floor and constructed in concrete or brickwork, or they may be made from wood or other material suitable for resisting corrosive action from the fumes being exhausted. Whatever the construction, the inside of the duct should be smooth and free from obstructions, the number of bends reduced to a minimum and sharp bends eliminated, if possible, so that the flow of air is not impeded. If metal ducting is used and the air or shop conditions are damp, it is advisable that the ducting be made from galvanised sheet or it will rust and destroy the smooth surface. Lap joints in the ducting should be in the direction of air flow as the joint will then tend to leak air into the duct rather than out. Also, the projecting thickness will not cause a build-up to provide an obstruction.

Resistance to flow of air in ducts is increased with roughness of the interior surface, sudden changes in direction of flow, higher air velocities and sudden change to lower velocity, obstruction in the duct and the length of the ducting. The air pressure required to overcome this resistance is measured in inches of water gauge. The fan chosen for the exhaust system must be capable of exhausting the volume of air required at this pressure. The sizes of ducts are determined by the volume of air they are required to carry and the air velocity required. Air velocities should be not less than the minimum which will carry the dust particles and sweep the duct clean.

Particle Sizes

This will depend upon the nature and size of the particles; higher velocities are necessary for larger particle sizes and where there is a tendency to stickiness. About 2000 ft. per min. is an average velocity, but 5000 ft. per min. is not uncommon. In long ducts the velocity should not be greater than necessary because of the high resistance to air flow that would result.

Where the main duct is joined by a branch duct its diameter should be increased to accommodate the extra volume of air at the same velocity. To maintain a smooth flow of air, the change in diameter should be accomplished gradually by means of a short tapered length of duct, and the branch duct should join the main duct in the direction of flow not at right angles. The outlet duct from the fan to atmosphere should also be tapered slightly, about 3 to 5 deg. each side, to reduce gradually the air velocity and minimise discharge resistance. The extraction from the various points must be balanced; that is, the total resistance from the fan to any extracting point must be the same at the desired air flows, otherwise the air flows will automatically adjust themselves to give equal resistance. This necessitates the employing of lower velocities in the longer branch ducts. It is advisable to provide a damper at each extraction point so that the volume of air extracted can be adjusted and the final balance made. Extraction systems do not lend themselves readily to the addition of further extraction points. Unless provision was made in the original design, this may cause the system to become unbalanced. In any case, before adding to a system a check should be made to ensure that capacity is available.

Adequate and sufficient cleaning eyes should be provided to enable the ducting to be readily cleaned; the eye should point

in the direction of air flow to minimise turbulence. It is a good plan to flange occasional bends which can then be easily removed to give access for cleaning. The tendency of operators to rap the ducting to loosen material adhering to the inside surface should be discouraged as the dents which are usually made form obstructions and increase the difficulties.

Having collected the fumes or dust at the fan they must now be disposed of. If the concentration is very slight they may be dispersed into the open air if this can be conveniently done. To aid dispersal and avoid baffling, the cowl over the outlet should be provided with an inverted cone.

If there is a higher concentration of fumes, it is advisable to filter or wash the air before it is discharged to atmosphere. It may be passed through an extraction plant to recover useful materials.

When there is more than a slight concentration of dust, it must be separated from the air before the air is discharged. One method of doing this is to pass the dust-laden air into a cyclone where centrifugal force assists in settling the dust particles. When handling highly explosive material, the fan should be on the outlet side of the cyclone to avoid passing it through a possible spark-producing area.

Another method of cleaning the air is to filter it through cloth fabric or similar screens. The dust-laden air is drawn through the screens, which may be of tubular or sheet form. There is a tendency for the dust to adhere to the screens and choke the pores. The screens are therefore attached to supports capable of being rapped or agitated to enable them to be shaken at intervals. When the screens become thoroughly choked and clearing is difficult, they should be replaced as, although they may still filter the air satisfactorily, there is an excessive resistance to air flow.

Two other methods are washing the air by passing it through a water spray, and electrostatic precipitation, in which the dust-laden air is passed between charged electrodes to which the dust particles are attracted and afterwards removed by rapping. The water screen involves a settling process and, of course, may destroy what might have been a recoverable product. Electrostatic precipitation is very efficient but rather expensive for the average plant: it is widely used in electric power stations to arrest grit from steam boiler installations burning pulverised fuel.

Automatic Controllers Applied to Chemical Processes

OVER the past decade applications of automatic controllers in the field of chemical processing had expanded rapidly, stated Mr. V. D. MacLachlan, B.Sc., M.I.R.E., in a talk given to the Scottish Section of the Society of Instrument Technology, at the Royal Technical College, Glasgow, recently. This was because of such factors as (1) processes being placed on a continuous basis with corresponding increase in operator responsibility; (2) standards becoming more rigid for both product quality and quantity; and (3) advanced design in process equipments.

Mr. MacLachlan cited typical uses of automatic controllers for general chemical processes and for common process equipments, and described corrosion problems involved. Heating in open kettles, tanks and vats was widely used in the chemical industry, he said, for melting, blending, concentrating, etc., or to accelerate reactions.

In applying control equipment in such cases, consideration must be given to (1) the heating medium and the manner in which it is to be applied to the vessel; (2) the construction of the vessel regarding size, shape, material of which it is made, agitation etc., and methods of loading and unloading; and (3) to the purpose of automatic control equipment.

Slides were shown to illustrate the application of automatic temperature control systems to nine variations of open vessel heating arrangements, and also automatic control of temperature and pressure in closed vessels. The lecturer discussed differential pressure controllers applied to flow and liquid level and the difference between and the application of remote transmission, ratio control and cascade or metered control.

To illustrate the considerable potential use, particularly in the chemical industry, of unusual or uncommon systems, examples of differential temperature control and the use of standard instruments to measure or indicate comparative specific gravity were also discussed.

Mr. MacLachlan also spoke on the instrumentation of heat exchangers, Dowtherm vaporisers, rotary kilns, and dryers.

A description of the application of automatic controls to distillation towers was given and a slide shown to illustrate the comprehensive control system applied to a normal type of fractionating column.

The lecturer concluded by discussing the various problems encountered with corrosive and hazardous atmospheres, etc., suggesting some solutions to these.

GEOCHEMIST'S QUEST FOR METALS

Experimental Use in an Australian Survey

VAST areas of Australia hitherto undeveloped are thought likely to yield the secrets of their mineral deposits to one of the newer methods of investigation.

Geochemical prospecting is still in its infancy, but much of Australia appears to be well suited to such methods. This is the opinion of Dr. V. P. Sokoloff, geochemist to the United States Geological Survey, reported in the November, 1948 issue of the *Chemical Engineering and Mining Review*.

Dr. Sokoloff, arrived in the Commonwealth last June, to carry out a series of investigations.

Mature residual soils of parts of Australia, and possibly some non-residual soils, are likely to contain geochemical anomalies in mineralised areas, such anomalies being related spatially and genetically to economically important ores.

The "poorly dispersed" elements, such as tin, lead, mercury, and similar metals, may produce well defined dispersion halos at no great distance from their source, both in semi-arid and in the humid environments.

The "dispersed" elements, such as zinc, nickel, and others, may form large but poorly defined dispersion halos. The "dispersed" elements, particularly in areas of ample rainfall, are likely to travel long distances in the dispersion train of the ore. It is possible, for example, for an orebody containing both lead and zinc to be indicated by zinc in the dispersion train and by lead in the halo.

In the U.S.A. work is being carried out chiefly in areas of known mineralisation in order, to obtain basic data. Later, it is likely that geochemical methods will be most useful in areas where neither geological nor geophysical methods can indicate ore bodies.

Spectrographical Examination

Most of the claims to have found ore bodies by geochemical methods have come from Russia, but few details have been given. It is said that they have discovered deposits, chiefly tungsten, molybdenum, and tin, by examining spectrographically soils up to nine feet thick.

In the Scandinavian countries, investigations have been under way since the 1930s.

The initiative in the application of geochemistry to prospecting has been taken in the United States by the U.S. Geological Survey. A geochemical unit has been established and is engaged in field, laboratory and greenhouse research, chiefly on the zinc, copper and lead contents of soils, plants, and waters in areas of known mineralisation.

Mineralised bodies near the surface are commonly accompanied by a chemical dispersion halo in the soil. This halo extends outward, both horizontally and vertically from the source, in a characteristic manner. By discovering these halos and determining their nature, shape, and size the geochemist may then be able to deduce the location, kind, and size of the sources.

Colour Reactions

Systematic samples of soil may be taken and tested in the field by methods that indicate abnormal concentrations of the indicator elements being sought. In general, colour reactions using certain organic dyes have been found to be most rapid and satisfactory. These indicate "high," "medium," and "low" concentrations of some 16 metals, and one person can carry out under favourable conditions as many as 100 tests per day.

The spectrograph has been used in these studies but to date has proved of limited value. In some cases examined, the total metal present in the soil bore no relationship to the ore bodies; whereas certain soluble forms of the metal indicated by colour reactions showed a correlation.

The relative values of determinations of total metal, as revealed by the spectroscope, compared with determinations of certain soluble salts of that metal, can only be assessed by actual field work.

Results are plotted on a map to facilitate interpretation, which is often difficult, since many factors, such as climate, topography, and geological history must be taken into account. A significant anomaly in one area may prove to be a blank in a different environment.

However, by applying all available knowledge to the problem, it is expected that valuable conclusions may be drawn.

A fascinating but controversial study is that of the role of plants as guides to prospecting.

Certain plants grow best when there is a high concentration of some metal in the soil. Of these indicator plants, those that grow in soils rich in zinc are well known.

Other plants accumulate certain metals in their tissues, analyses of which may indicate geochemical halos. Zinc, nickel, copper,

(*Concluded at foot of following page*)

Chemicals' Rôle in "Industrial Canada"

Volume of Production 75 Per Cent Higher than Pre-War

SPEAKING of the chemical industry in Canada, at a recent meeting of members of the Quebec Rotary Club, Montreal, Mr. Bernard Brouillet, of Canadian Industries, Ltd., remarked that nine of the 28 plants of the company were located in Quebec province and that it employed almost 8000 of the 37,000 Canadians engaged in the chemical industry. Of the 320 chemical plants in the country, almost one-third were located in Quebec.

"Canada is rapidly becoming an industrial nation, and the chemical industry is keeping pace with industrial expansion," Mr. Brouillet emphasised. In 1947, the production of chemicals exceeded the peacetime effort. According to the Dominion Bureau of Statistics, the 1947 production was estimated at $448 million compared with $376 million in 1946—an increase of 19 per cent. Compared with 1939, the total production of the Canadian chemical industry increased 180 per cent in value and 75 per cent in volume.

Throughout his talk Mr. Brouillet showed numerous articles of everyday use which were made possible through chemical research. These included surgical and dental instruments of "lucite" plastic, coaxial cables used in radar and television, and DDT insecticide bombs.

* * *

The demand for the products of Canadian Industries, Ltd., was well maintained in 1948 and the upward trend in sales continued during the first nine months of the year, it was announced by Mr. George W. Huggett, president and managing director of the company. Because the company's plants had been generally operating at or near capacity for some years, the greater production achieved last year was attributable to the completion in 1948 of a large proportion of the post-war programme of plant expansion and process improvement, Mr. Huggett stated. In spite of the large amounts already spent on new construction, the present and potential demand for chemicals and allied products would necessitate still further additions to manufacturing capacity. Accordingly, new projects expected to cost $7 million were authorised by the company in the first three-quarters of 1948.

The total net income for the year was not expected to show any major change from the 1947 aggregate because the increase in profits resulting from the improvement in sales and the greater investment in manufacturing facilities would be almost offset by a drop in investment income. In explanation of the decreased investment income, it was pointed out that results for 1947 included a non-recurring distribution of accumulated surplus by Defence Industries, Ltd., war-time subsidiary of C.I.L., as well as dividends on shares of other concerns which had since been sold by the company.

Big Orders for W. Germany.—The German Joint Export-Import Agency has signed contracts to import 9500 tons of pure aluminium into the bizone. Switzerland is to supply 4500 tons and Italy 5000 tons.

GEOCHEMIST'S QUEST FOR METALS

(Continued from preceding page)

and cobalt are stored chiefly in the plant leaves; lead and arsenic, on the other hand, tend to accumulate in plant roots, but a practical problem is that they favour fine roots, which are difficult to collect in sufficient quantity.

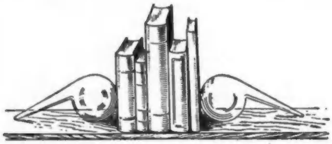
The available experience in U.S.A. so far is that plants are, in general, not sufficiently precise as indicators of geochemical anomalies. The reason for this is that they respond to many factors, such as topography, exposure, drainage, and, particularly, the "availability" of the metal.

Sweden, Finland, and U.S.S.R., however, claim to have found plants useful in outlining halos, so the results of tests now under way are being awaited with interest.

A simple form of prospecting is to test surface waters and ground waters in order to locate unusually high concentrations of heavy metals.

For this purpose, an organic dye that will indicate non-selectively less than 0.0001 per cent (or less than 1 microgram per aliquot) of zinc, copper, lead and silver, as well as several other metals, over a fairly wide range of acidity or alkalinity, is commonly used. By following colours upstream, the prospector is generally able to locate the source, whereupon a more thorough investigation is likely to be indicated.

The examination of water as a procedure of general exploration in virgin country may be a great time saver.



A CHEMIST'S BOOKSHELF

Physico - Chemical Methods. Vol. III (Supplementary). Joseph Reilly and William Norman Rae. London: Methuen. Pp. ix + 697. Illus. 55s.

The fourth edition of Reilly and Rae's deservedly well-known work was published five years ago. In the interval, much has been added to the literature on methods which have already been collated by the authors, while a number of new topics have commended themselves as worthy of inclusion in a comprehensive treatment under this title. In preference to the production of a complete new edition in which much must stand, and in which the alterations would primarily consist of additions, the issue of a supplementary volume has seemed to be the most practical way of making the new information generally available. The authors have tackled their new volume as competently as would be expected by one familiar with the first two volumes, and they have not hesitated to seek the advice of experts, acknowledged in the preface, where the topics are highly specialised.

The chapters are as follows: electron optics; photo-physics; atomic weights; the mass spectrograph. molecular weights; diffusion; solution; osmotic pressure; kinetics of homogenous reactions; hydrogenation; surface tension; viscosity; adsorption; chromatography; colloids; emulsions; high vacuum technique; micro-gas analysis; analysis of mixtures; electrolytic oxidation; miscellaneous. There are, in addition to the references throughout the text, 15 pages of bibliography, offering a useful basic guide to the literature of each of the topics covered in Volume III.

The authors are to be commended for their choice of new topics, and their enterprise has now made available valuable introductions to one or two topics which were previously covered only in highly specialised texts, or in papers scattered throughout the literature. The topics which they have chosen for extensive addition will also be welcomed, although one or two further methods might well have been included. However, it appears from a note on the book jacket that a new (fifth) edition of Volumes I and II is now in preparation, and this will no doubt allow for some revision of certain chapters already contained therein.

The book is well-produced, being uniform with the first two volumes and equally comprehensively and clearly illustrated. Possibly the only note of criticism called for refers to the proof-reading. In the bibliography, where admittedly errors are most likely to occur, but where, at the same time, they may prove to be most serious, a casual reading for five minutes revealed more than twice that number of obvious errors in names and titles.

Encyclopaedia of Chemical Reactions. Vol. II. Compiled and edited by C. A. Jacobson. New York: Reinhold Publishing Corporation. London: Chapman & Hall. Pp. xiii + 917. 72s.

The first volume of this work has already been reviewed here (The Chemical Age, 1946, *55*, 575) and the plan of that volume is continued in the present one. The elements covered here are cadmium, calcium, carbon, cerium, caesium, chlorine and chromium, and once again the reader must be impressed both with the wealth of information collected here, and with the gaps which must exist, partly due to lacunae in our knowledge, and partly arising from the fact that the complex machinery for compiling complete data regarding inorganic reactions must of necessity break down from time to time. Many additional entries were received after Volumes I and II had gone to press and are now filed in readiness for the preparation of one or more supplementary volumes.

After two years use of Volume I, the reviewer has noted two apparent defects in the system of collation. In the first place, the earliest references to each reaction are usually given. In this way important comments which must subsequently have been made on the reactions as first recorded may be missed.

There is also a certain lack of co-ordination which could result in the user missing information which is actually contained in the book. This is illustrated in the present volume. In the first section (cadmium), reaction II-39 is that between cadmium chloride and potassium mercuric-seleno-

cyanate. At first sight there appeared to be no record of the corresponding, and better known, reaction with potassium mercuric thiocyanate. Reference to the index, however, revealed the existence of reaction II-113, (18 pages from the first) and apparently unrelated. This proved to be the reaction between cadmium sulphate and potassium mercuric thiocyanate.

It is clear now that we are dealing here essentially with reactions of the cadmium ion, and that the anion associated with it has no important bearing on the course of the reaction. Consequently these reactions should undoubtedly by presented side by side. The criticism gains force from the fact that the similarity of reactions given by the amonium salt of the reagent and the potassium salt, is not mentioned in the present volume. The non-essential ion has been disregarded when considering the reagent, although it has been allowed to interfere with the classification of the cadmium salt.

Minor defects, however, do not detract seriously from the importance of the contribution which this series of volumes makes to the essential literature of inorganic chemistry. Altogether there are 141 separate entries for cadmium, 623 for calcium, 1439 for carbon, 232 for cerium, 178 for caesium, 302 for chlorine and 416 for chromium—a total of 3331. The editorial board seems to have coped very successfully with the problem of determining the correct amount of the chemistry of carbon to be included in a volume of inorganic reactions. It is somewhat surprising to find the sections on cadmium and chlorine so small. There are comprehensive indexes to reagents and to the products of reaction, and a brief note on the method of indexing the co-ordination compounds of chromium and cobalt.

Factory Law, by H. Samuels. London: Stevens. Fourth Edition. Pp. 674. £2 5s.

The fourth edition of this established work, based on the Factories Act, 1937, which consolidated the law up to that date, brings the account to the present. A brief outline of the Factories Act, 1948, was given in THE CHEMICAL AGE (*59*, 277-8), shortly after that measure received the Royal assent. As was seen then, some important changes and additions have been made. It was therefore opportune for Mr. Samuels to produce a new and up to date edition. He has also been able to deal with the Contributory Negligence Act 1945 and the Personal Injuries Act 1947 (THE CHEMICAL AGE, *57*, 721), both of which bear on his subject.

The book opens with a brief historical account of factory legislation. It then passes to the 1937 Act, which it deals with section by section, by annotating the text. Where regulations have been issued under a section they are quoted in full, except the regulations for dangerous trades which are printed in alphabetical order, with contemporary commentary. These include the Regulations for the Building Industry, which were issued recently and are far-reaching in their effect. The 1948 Act is also dealt with by sections. The Employment of Women and Young Persons Act 1936 is printed, together with a number of other Acts, Rules and Regulations of value to those engaged in industrial law or welfare. This is a work of reference, and, while it is just what the expert needs, it is essentially a book for the expert only.

GERMAN CEMENT

ACCORDING to recent reports on the present situation of Germany's cement industry—which before the war occupied second position among world producers, with 12.6 million tons, the United States being first with 19.8 million tons—67 units are at present operating in the bizone as compared with 112 units in 1937 for the whole country. The capacity of the industry is estimated at 12.5 million tons in the three western zones, of which 6.7 million tons are in the British, 4.1 million tons in the U.S., and the remainder in the French zone.

Output amounted to 2.7 million tons in 1946 and 3 million tons in 1947. As a result of the lack of coal and power, however, no increase has been registered for last year. Roughly 30 per cent of the output of the Anglo-U.S. zones comes from one neighbourhood in Westphalia.

AID TO STEEL ROLLING

A FURTHER development of the Statimeter, invented by Mr. Albert Thomas Hughes before the war, is likely to prove beneficial to the British steel industry.

The invention can be applied to all types of rolling mill, and Mr. C. Hughes, son of the inventor, has claimed that its application to steel would reduce error, ensure uniform thickness and standardised products, avoid waste, save power, and expedite production.

In the U.S.A. the development was said to have been widely accepted, and plans were in preparation for the complete system to be used on one of the largest American hot strip mills.

Details of the invention have been submitted to the Industrial Association of Wales and Monmouth, which has been in touch with leading Welsh manufacturers.

Technical Publications

IN an era of Government control and nationalisation, it is refreshing to be reminded of the many successful business houses that owe their prosperity to private initiative. In "The Acorn that Grew into an Oak," the story of Potter & Clarke, Ltd., is told by Peter S. Baker in a compact book with many illustrations covering the period from the days of the business's foundation in 1812 by Mr. Henry Potter (who bred leeches in his own ponds at Brixton Hill) to the P. & C. analytical laboratories of to-day with their 2000 standard samples.

* * *

A useful chemical bibliography is provided by "Let's Look It Up," the 1949 catalogue of the Reinhold Publishing Corporation, New York. This starts with chemical works of reference, and covers books on agricultural chemistry; biochemistry; chemical engineering and industrial chemistry; colloid chemistry; organic and physical chemistry; drugs and medical; food and nutrition; petroleum; paint, varnish and ink; plastics, rubber and gums, and process industries products (cement, glass, heavy chemicals, leather and paper).

* * *

Industrial and scientific instruments ranging from the simple mercury-in-glass thermometer to completely engineered control schemes involving the use of a number of inter-related and fully stabilised controllers, are described and illustrated in a booklet (List B.19) just issued by Negretti and Zambra, London. Seventeen instruments are dealt with, and a series of useful reference tables is given.

A reference book of value to anyone interested in refrigeration has been compiled from practical experience by A. E. Miller, entitled "Refrigeration Note Book" and published by Leonard Hill, Ltd. (10s.). The difficulties of producing a concise but comprehensive survey of the industry which is not too academic, too technical or too elementary have been considerable. This publication meets those difficulties well. The text, divided into five sections, contains 62,000 words; there are 67 useful tables, and 42 diagrams and plates.

* * *

A service to all research workers is rendered by the 1948-49 edition of the technical, scientific and business book catalogue issued by Kroch's Bookstores, Inc., Chicago, Illinois. Among the 700 books from more than 90 publishers, there are 102 in the sections devoted to chemical engineering, and chemistry general and industrial, and seven on the subject of metallurgy. Under the dictionaries and encyclopaedias are included Von Nostrand's Scientific encyclopaedia, the concise chemical and technical dictionary (Bennett) and also French-English, German-English, and Russian-English technical and chemical dictionaries.

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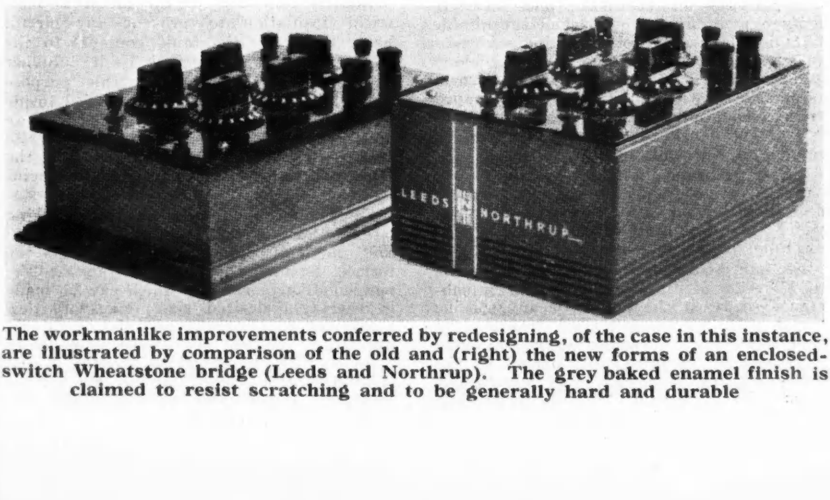
The Phosphor Bronze Corporation. 2200 Washington Avenue, Philadelphia 46, Pa., is offering a new technical data book, including tabular data on the physical properties, chemical analyses, specifications and typical uses of this alloy. Information about spring design and machineability data are included.



The workmanlike improvements conferred by redesigning, of the case in this instance, are illustrated by comparison of the old and (right) the new forms of an enclosed-switch Wheatstone bridge (Leeds and Northrup). The grey baked enamel finish is claimed to resist scratching and to be generally hard and durable

Widening Uses of Rubber Containers

Development Board Reviews Innovations

THE use of rubber, in its various forms, as a container for liquids and as an insulation material for containers, offers promise of solving many current-day difficulties of packing, storage and transport, writes the British Rubber Development Board. Latex foam or sponge rubber has been increasingly used to cushion in transit delicate apparatus or fragile articles, such as large radio and other electronic valves. A similar arrangement can be used to ensure safe transit of glass Winchesters, for example, of acids, alkalis, flasks of serum, etc.

Cost

For the transport of many liquids glass carboys and jars are not only expensive and heavy, but to protect them against breakage they need an outer crate or container lined with straw, which adds considerably to their cost. The return of such empties is an additional and heavy expense and breakages are not infrequent. At present, difficulties of supply add to the problem of using glass or metal containers—the latter, of course, cannot be used for many corrosive liquids.

There has recently been devised an all-rubber container which, when empty and folded, resembles a hexagonal football bladder. Holding two galls., the container when filled, assumes rectangular shape and fits neatly into the customary type of collapsible outer box, which may be of fibreboard, plywood, etc.

These containers have been accepted by the railways for the conveyance of non-dangerous liquids when packed in suitable fibre-boards and the total packing can resist to a remarkable extent the impact of blows and dropping. In actual tests such containers, filled with liquid, have been dropped from considerable heights. The outer fibre-board box has been damaged but none of the liquid was spilt or lost.

These rubber containers, says the board, can find considerable use in the chemical and allied industries for transport of liquids which do not act on rubber—ink, for example, could be supplied in these.

An interesting development lies in coating the interior of the container with a substance to resist the action of any specific liquid and, for the proposed transport of beer overseas, it was necessary to avoid any taste or odour being imparted by the rubber. The container was accordingly lined with a specially devised aluminium foil. Now, rubber can be made which does not impart odour or taste.

The Rubber Development Board also calls attention to some recent improvements, using expanded rubber, in the construction of insulated transit containers of a kind widely employed for frozen foodstuffs, pharmaceutical products and many types of perishable goods. The new design employs expanded rubber to form the insulated core. Such containers are robust and light enough to be handled and loaded by one individual. The inner, water-tight space is of light alloy, the insulating core of expanded rubber being of uniform thickness around it.

The outer carcase is also of light alloy, suitably reinforced at the top and bottom edges. The light alloy underface of the hinged lid is fitted with a sponge rubber seal and the containers have been designed to give satisfactory results under a temperature differential of 90°F., the most efficient coolant being solidified carbon dioxide, although many other eutectics can be employed.

The new insulated containers also afford a useful cool-chamber for laboratory and works.

By suitable treatment a wide range of conditions can be produced with rubber which enable it to be used as a liner for tanks to contain various concentrations of corrosive fluids such as hydrochloric, nitric, sulphuric, acetic and phosphoric acids.

Electrical Insulation

Equally important is the factor of electrical insulation to prevent any circuit being made *via* the tank contents to the metal structure of the tank itself. Rubber is eminently satisfactory for this purpose and the tanks are normally covered inside with rubber sheeting, first attached with an adhesive and ultimately vulcanised *in situ*—often by the simple method of filling the tank with water maintained at boiling point by steam inlets.

Containers may also be lined by applying latex either by spray or by dipping, and this method promises to outstrip the former, by virtue of its effectiveness. The new conductive rubber, which can be made in sheets of desired size, opens up new possibilities of rubber-lined containers which may be kept at an over-all constant temperature by means of this novel electrical heating element, which can be adapted for transport, storage and reaction vessels.

Home News Items

Titanium Oxide.—An increase in the price of titanium oxide to £102 per ton (delivered, in bags) was announced last week by one of the principal distributors in the U.K.

90 Aluminium Carriages.—An order has been placed with the Metropolitan-Cammell Carriage & Wagon Company, Birmingham, for 90 cars of aluminium alloy for the London Underground, the first rolling stock of that kind to employ the light alloy extensively. The Metals Division of I.C.I., Ltd., is collaborating in filling the order, which will cost £1.25 million.

Liverpool Chemists' Centenary.—To celebrate the centenary of the Liverpool Chemists' Association, the Lord Mayor and Lady Mayoress of Liverpool (Alderman and Mrs. Lancashire) held a reception in the Town Hall last week, and welcomed more than 400 guests. Assisting them to receive the guests were Mr. H. Humphreys Jones, president of the association, and his wife.

Record Rubber Lining.—A tank to hold 320,000 gall. is now being lined with rubber by workers from the Dunlop Rubber Company's factory in Cambridge Street, Manchester. It is believed to the largest ever treated in his way. The weight of rubber used, including adhesive, is almost 5 tons, to cover a diameter of 52 ft. 6 in. by 23 ft. 9 in. deep. The lining is being done through several manholes.

Hydro-electric Scheme Casualties. — A further serious accident in the course of excavation work concerned with the hydro-electric power development in the Scottish Highlands was reported on Monday. Workers were blasting out the end of a tunnel for the Fannich, Ross-shire, development when debris was blown 150 yards on to another working party in the open, of whom one suffered a fractured skull and 14 received smaller injuries.

Royal Institution Lectures.—A number of courses of lectures which may be attended by non-members are announced by the Royal Institution to take place on Tuesdays and Thursdays before Easter. The list includes the following: Thursdays, January 27, February 3, 10 and 17, at 5.15 p.m.: H. W. Thompson: "Infra-red Measurements in Physics, Chemistry and Biology." Tuesdays, March 15, 22 and 29, at 5.15 p.m.: Prof. H. J. Emeleus: "Some Recent Advances in Radiochemistry." Thursday, March 17, 24, 31 and April 7, at 5.15 p.m.: Prof. Sir Lawrence Bragg: "The Physics of the Solid State."

Shell Service.—Shell Chemicals, Ltd., is opening a new divisional office at 12 Linden Park, Tunbridge Wells in mid-January. It will serve as a service department for users of Shell chemicals.

Soap Rationing Changes.—All non-domestic users of soap (including catering establishments and institutions) who obtain soap on permits Soap 2A will be given the opportunity of changing their suppliers for the year beginning March 27, 1949, when the next issue of permits is made.

900 h.p. for Auxiliary Supply.—A 900 h.p. diesel engine, formerly part of a tank-landing craft, driving a 600 kW generator, has been installed at the Mitcham Works of Philips Electrical, Ltd., in a specially built power house. The diesel component weighs well over 15 tons and was purchased in the U.S.A., no suitable equipment being obtainable quickly in this country. It will provide the works' auxiliary power supply.

Coal Output.—Total coal production in Britain last week was 534,700 tons more than in the previous week—a holiday period —and 227,500 tons more than the weekly average for 1948. Comparative output figures were: Last week, 4,235,700 tons (4,061,000 tons deep-mined, 174,700 tons opencast). Previous week: 3,701,000 tons (3,608,000 tons deep-mined, 93,000 tons opencast).

Printing Ink Makers Since 1852. — A study of the inception and development of one of the oldest printing ink manufacturers in Scotland, now nearing its century, is given in a current Edinburgh Chamber of Commerce survey of the lesser-known industries of the city. The firm is A. B. Fleming & Co., Ltd., which was founded in 1852, and which to-day, in addition to its extensive printing ink factory, has a separate works for the manufacture of dry colours for use in printing inks.

Higher Cost of Steel Products.—Increased prices for several categories of steel products are authorised as from January 11 by the Iron and Steel (No. 68) Order, 1949, which makes substantial changes in respect of galvanised sheets and hot finished tubes, galvanised wire nails, stainless steel and nickel-bearing alloy steels. The basis prices of stainless steel are raised by ¼d. to ¾d. lb., galvanised sheets (thinner than 3 mm.) will cost 65s per ton more and "galvanising extra" is increased by 35s. ton in respect of certain seamless or cap welded tubes and pipes.

Overseas News Items

More Paper Plant for U.S.S.R.—The Soviet authorities have decided to build some 40 smaller paper factories in various parts of the country at a cost of about 400 million roubles.

Berlin Lignite Deposits to be Exploited.—The Berlin Magistrate has agreed to grant 100,000 marks for the exploitation of lignite deposits which have long been known to exist in the Reinickendorf and Spandau districts of West Berlin. Drilling is in progress.

Shell Plans in Australia. — Extensive schemes for development in Australia are planned by the Shell Group, according to *The Melbourne Argus*. Test drills to a depth of 4000 ft., at a cost of £A1 million, are to be made at Rolleston, Queensland. Expansion is also to be carried out at the Parramatta refinery, New South Wales.

Czechoslovak Foundry Developments.—An article by Dr. Adolf M. Plesinger, Prague, in the November issue of *Hutnické Listy*, the organ of the Czechoslovak Metallurgical Works and of the Czechoslovak Foundrymen's Association, reviews Czechoslovak foundries and their post-war development and compares production with that of the U.S.A. and Soviet Russia.

French Nitrogen Prospects.—The French Modernisation and Equipment Plan anticipates that nitrogen production in 1952 will be 350,000 tons, eventually to be raised to 500,000 tons. Realisation of this objective implies development of work by the French coalmines in their synthesis plant, the construction of a plant at Carling and another at Roussel.

Oil Near Lake Constance?—Large unnamed oil groups are reported to have obtained concessions to explore and exploit oil deposits in the Radolfzell and Markdorf areas of Baden, where geological surveys have been in progress over an area of 500 sq. km. during the last few months. The possibility is now recognised that an entirely new part of Central Europe may become an oil producer.

Egyptian Oil Find.—What is claimed as likely to be the biggest oil "strike" in the Middle East has been made about 10 miles south of a well which was discovered at Sudr, in the Sinai Peninsula, Egypt, in 1947, states a message from the Cairo correspondent of the *Daily Telegraph*. The American Socony Vacuum Oil Company, in conjunction with Anglo-Egyptian Oilfields, has drilled two wells capable of producing 40,000 barrels a day.

Poor Italian Coal Output.—Labour difficulties brought a sharp decline in Italy's coal production in 1948, by 353,000 tons to a total of only 833,000 tons, which was lower than the figure for both previous years. Virtually all came from Sardinia.

Rising Oil Output.—The Argentine State Oilfields reports that production of petroleum by the State-owned wells amounted in 1947 to 2,425,716 cu. m., compared with 2,259,757 cu. m. in 1946 and 2,456,894 in 1945. The downward trend of production which occurred during the war, owing to lack of oil-drilling machinery and spare parts, has been reversed.

ERP Aid for Austrian Steel Company.—The importance of steel supplies to Austria's national economy has enabled the Alpine Montangesellschaft, her leading steel and mining group to obtain a loan for replacement by collaboration of OEEC of the mill at Donawitz. Relatively early delivery of plant is expected, and it is hoped the work will be completed in about two years.

Swedish Ore for Germany.—2.8 million tons of Swedish iron ore have been purchased by Western Germany to be delivered during the current year, and negotiations are in hand for delivery of a further 521,000 tons. Contracts already signed represent a value of more than £6 million. In exchange, Germany is to ship to Sweden 155,000 tons of iron and steel, as well as 25,000 tons of steel products.

Aluminium Output Doubled. — Austria's production of aluminium in the first nine months of 1948 reached nearly 11,000 metric tons, or almost double the quantity produced in 1947 (5780 tons) and 1937. The January-September output, however, was equal only to about 20 per cent of Austria's annual aluminium production capacity. Shortages of alumina obtained from France and Switzerland, were a bottleneck. There is also a lack of electric energy.

Britain Opposes WFTU.—At the close of the first day's proceedings in Paris, last Monday, of the executive bureau of the World Federation of Trade Unions, Mr. Arthur Deakin, of Britain, the president, said it seemed that no agreement between the policies of the Communists and those of the western representatives was possible. He made it clear that nothing less than the suspension of the activities of the WFTU would meet the TUC requirements. No compromise of any kind would be acceptable to them.

Personal News and Appointments

CHANGES in office dating from the first of this month are announced by the Association of British Chemical Manufacturers. The post of joint manager held by the late Mr. R. Murdin Drake will be discontinued. Mr. A. J. Holden assumes wider responsibilities and, while acting as manager and deputy to Mr. J. Davidson Pratt, the director and secretary, will continue as secretary of the British Colour Makers' Association. Mr. W. A. Williams, senior technical assistant, takes charge of the work on pest control, acting as secretary of affiliated associations connected with animal medicine, insecticides, sheep and cattledips, and disinfectant manufacturers. Mr. H. W. Vallender is transferred to help Mr. A. G. Mussell with much of the work formerly supervised by Mr. Drake. Mr. W. J. Shorthose, who has been assisting Mr. Holden, now deals with fuel efficiency and patent matters, in addition to pigment colours and the British Industries Fair.

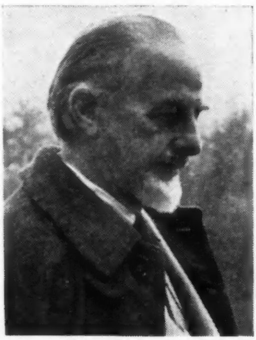
Dr. J. Van Nostrand Dorr, founder of the widespread Dorr organisation, is retiring from the presidency of the Dorr-Oliver Co., Ltd., and will become chairman of the board of directors. Dr. Dorr's successor as president is Mr. Elmer R. Ramsey, who has served the company in various capacities for 35 years. Dr. Dorr has been awarded many honours to mark his achievements as a chemical and metallurgical engineer; among these are the John Scott medal of the Franklin Institute in 1916, the James Douglas medal of the American Institute of Mining and Metallurgical Engineers in 1930, the Chemical Industry medal of the Society of Chemical Industry in 1938 and the Perkin medal in 1940.

In recognition of his distinguished contribution to the advancement of physics, Prof. P. M. S. Blackett, who was recently awarded the Nobel prize for his work in atomic research, is to receive the Dalton Medal of the Manchester Literary and Philosophical Society. The presentation will be in October and Prof. Blackett will be the seventh recipient of the medal, which commemorates John Dalton. Sir Lawrence Bragg was the last so honoured.

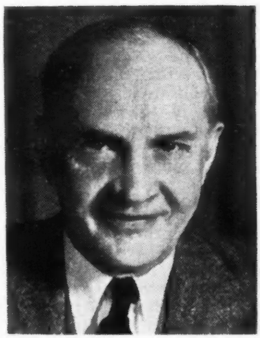
Mr. J. E. Whitehall, who has been actively connected with the business of Kemball, Bishop & Co., Ltd., Crown Chemical Works, Three Mill Lane, Bromley-by-Bow, London, E.3, for more than 50 years, and has been a joint managing director of the company since 1913, resigned that appointment on December 31. He will continue as a director of the company and as chairman of the board of directors.

The Monopolies and Restrictive Practices Commission has appointed as secretary, Dame Alix Kilroy, D.B.E., who is now Under-Secretary at the Board of Trade, in charge of Industries and Manufactures Department, Division 1.

Prof. Wiktor Kemula, director of the Institute of Inorganic and General Chemistry in Warsaw and Dean of the Faculty of Science in Warsaw University, arrived in Britain on January 14 for a three weeks' visit under the auspices of the British Council to see chemical laboratories and meet professors of chemistry. He has been given facilities this week to meet some of the best known chemists and physicists in



Dr. J. Van Nostrand Dorr



Mr. Elmer R. Ramsey

Mr. L. G. Northcroft (joint managing director of Spirax Manufacturing Co., Ltd., and Sarco Thermostats, Ltd.,) awarded the O.B.E.

London and on Thursday begins a provincial tour, including visits to Oxford (January 20-22), Liverpool (January 24-26), Manchester (January 27-28) and Cambridge (January 31). After February 3, he will remain for a further week in London, to order chemical and physical laboratory equipment for use in the laboratories in Warsaw.

MR. H. STUART EBBEN, chairman of Manchester Oil Refinery, Ltd., and MR. S. R. JARVIS, director of Raven Oil Co., Ltd., are among the re-formed board of "Albatros" Société Anonyme Belge pour le Raffinage de Pétrole, which is the new name of the old "Redeventza" company. Reconstruction of the firm's refinery at Antwerp—which was badly damaged during the war—has now been completed and operations are to be resumed this month.

The British Council has arranged a series of lectures to be given by MR. E. V. B. HORFORD, Director of the DSIR Pest Infestation Laboratory at Slough, in Iraq from January 26 to February 7, and in Egypt from February 8 to February 26. Mr. Horford was Research Entomologist at the Imperial College of Science, London, before taking charge of the Pest Infestation Laboratory in 1940.

Nobel Chemistry prizes awarded to them in 1939 are to be received by PROF. RICHARD KUHN and PROF. ADOLF BUTENANDT, who were originally prevented from accepting them by Hitler. They will receive the gold medals and diplomas, but under the terms of Alfred Nobel's will cannot be given the money connected with the award.

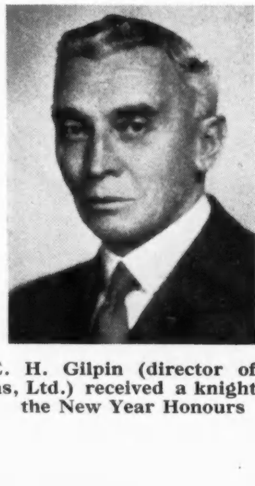
MR. E. W. TAME has resigned his position as town clerk of Birkenhead to become a member of the newly-constituted North-Western Gas Board. MR. EDWARD MORGAN EDWARDS, manager of Port Talbot Gas Department, has been appointed a whole-time member of the Welsh Gas Board (salary £3000). The four who have been appointed part-time members (£500 p.a.) are respectively a Glamorgan County Cricket player, now a Test match selector, a tinplate worker and former Mayor of Neath, the clerk of Denbigh County Council and an accountant.

MR. H. HUMPHREYS JONES, 70-year-old principal of the Liverpool School of Pharmacy and centenary president of the Liverpool Chemists' Association, is one of three nominated as high sheriff for his home county of Caernarvonshire next year. The School of Pharmacy, which he has controlled for 41 years, has trained more than 5000 pharmacists.

MR. J. W. TULLO, B.Sc., F.R.I.C., has retired from the post of chief chemist to Arthur Guinness, Son & Co., Ltd., brewers, Dublin, with whom he has been associated for the past 50 years. MR. J. ANDREWS is the new chief chemist.

The Pharmaceutical Society has appointed MR. F. W. ADAMS, deputy secretary, to be joint secretary with MR. H. N. LINSTEAD, M.P., to enable the latter to carry on with his public work. Mr. Adams will also be registrar in succession to Mr. Linstead.

MR. J. W. CRAGGS, managing director of a Pelaw-on-Tyne chemical company, has been adopted prospective Liberal candidate for the Wallsend Parliamentary Division.



Mr. E. H. Gilpin (director of Baker Perkins, Ltd.) received a knighthood in the New Year Honours

Next Week's Events

MONDAY, JANUARY 24

Birmingham University Chemical Society. Birmingham: University, Edgbaston, 4.30 p.m. Dr. Malcolm Dyson: "A New Enumeration System for Chemical Compounds."

The Chemical Society. Oxford: Physical Chemical Laboratory, 8.15 p.m. Alembic Club Lecture. Prof. N. V. Sidgwick: "Some Remarks on the Periodic Table."

Textile Institute (Yorkshire Section). Halifax: Alexandra Café, King Edward Street, 7.30 p.m. F. L. Goodall: "The Battle Against Textile Pests."

Institution of Works Managers, Ltd. Glasgow: Institution of Engineers and Shipbuilders in Scotland, 7 p.m. C. J. King: "Lighting as an Aid to Production."

Sir John Cass Technical Institute. London: Department of Chemistry, Jewry Street, Aldgate, E.C.3, 6.30 p.m. N. W. Roberts: 'Thermodynamics for Chemical Engineers" (No. 2).

TUESDAY, JANUARY 25

Royal Institute of Chemistry (London and South-Eastern Counties Section). Slough: High Duty Alloys, Ltd., Buckingham Avenue Trading Estate, 2.45 p.m. Lab.; 6 p.m. meeting. Prof. H. V. A. Briscoe: "The Chemistry of Dusts."

Society of Public Analysts and Analytical Chemists (Physical Methods Group). London: Imperial College of Science and Technology, South Kensington, 6 p.m. G. W. Scott: "Industrial Applications of Rheology"; A. J. Amos: "Application of Rheological Methods in Milling and Baking Industries"; R. H. Marriott: "Use of Rheological Tests in Pharmaceutical and Cosmetical Industries"; P. S. Williams: "Rheological Methods and their Uses in Paint Industry."

Institute of Fuel (London Section). London: Institution of Mechanical Engineers, Storeys Gate, S.W.1, 10 a.m. and 2 p.m. Full day conference. J. Edward: "Elements of the Heat Balance"; J. B. M. Mason: "Heat Balances in Practice"; Dr. E. G. Ritchie: "Steam Peaks."

WEDNESDAY, JANUARY 26

Manchester Literary and Philosophical Society (Chemical Section). Manchester: Portico Library, Mosley Street, 5.30 p.m. H. Stevenson: "Long-Term Policy in Chemical Industry, Especially in Textiles."

North-Western Fuel Luncheon Club. Manchester: Engineers' Club, 12.45 p.m. Dr. R. Holroyd: "The Romance of Hydrogenation" (illustrated by lantern slides).

Institute of Welding. London: Institution of Civil Engineers, 6 p.m. The Sir William J. Larke Medal Paper.

Engineering, Equipment and Materials Exhibition. London: Old Horticultural Hall, Vincent Square, S.W.1 (until February 9).

British Association of Chemists, Liverpool and North-Western Area. Liverpool: University, 7 p.m. V. Biske: "The Law and the Chemist." London: Small Conway Hall, Red Lion Square, W.C.1, 7 p.m. F. A. Robinson: "Antibiotics" (illustrated by lantern slides).

Society of Instrument Technology. London: Manson House, Portland Place, W.1, 6.30 p.m. Dr. K. M. Greenland: "Interference Films on Glass and their Use in Optical Instruments."

THURSDAY, JANUARY 27

The Chemical Society. Aberdeen: Marischal College, 7.30 p.m. Joint meeting with local sections of the Royal Institute of Chemistry and the Society of Chemical Industry. J. G. Grundy: "Application of Dyestuffs to Materials other than Textiles." Nottingham: University, 6.30 p.m. Joint meeting with the Chemical Society of Nottingham University. Dr. A. F. Wells: "Some Aspects of Structural Inorganic Chemistry."

Royal Institute of Chemistry. Manchester: Engineers' Club, 6.30 p.m. Annual general meeting. Derby: 7.15 p.m. Dr. J. Grant: "Woodpulp."

Institute of Metals. Birmingham: James Watt Memorial Institute, Great Charles Street, 6.30 p.m. Symposium on "Clad Metals."

Sir John Cass Technical Institute. London: Department of Chemistry, Jewry Street, Aldgate, E.C.3, 6 p.m. David W. Wilson: "Microchemical Analysis" (No. 2).

The Royal Society. London: Burlington House, W.1, 4.30 p.m. Sir Harold Spencer Jones: "The Royal Greenwich Observatory."

FRIDAY, JANUARY 28

The Chemical Society. Newcastle: King's College, 5 p.m. Tilden Lecture. Prof. F. E. King: "Three- and Four-Membered Heterocyclic Rings." Southampton: University College, 5 p.m. Joint meeting with the Chemical Society of Southampton University College. Dr. R. P. Linstead: "Some Aspects of Recent Work at the Chemical Research Laboratory, Teddington."

Sir John Cass Technical Institute. London: Department of Chemistry, Jewry Street, Aldgate, E.C.3, 6.30 p.m. First of seven lectures, "Unit Operations in Chemical Engineering." J. C. Farrant: "Size Reduction."

Commercial Intelligence

The following are taken from the printed reports, but we cannot be responsibe for errors that may occur.

Mortgages and Charges

(Note.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described herein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every company shall, in making its Annual Summary, specify the total amount of debt due from the company in respect of all Mortgages or Charges. The following Mortgages and Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced.)

MAY & BAKER, LTD., Dagenham. (M., 22/1/49. November 29, Trust deed dated November 24, 1948, securing £750,000 debenture stock and premiums of 10 per cent in certain events; charged on specified properties at Dagenham, etc., and general charge (subject to etc.). *£116,878 November 3, 1948.

UNIVERSAL STEEL TUBE CO., LTD., Birmingham. (M., 22/1/49.) December 3, debenture, to Barclays Bank, Ltd., securing all moneys due or to become due to the bank; general charge. *Nil. May 27, 1947.

Satisfactions

ASSOCIATED CHEMICALS, LTD., Richmond, Surrey. (M.S., 22/1/49.) Satisfaction December 8, £1750, registered July 17, 1947.

PEAK PETROLEUM CO., LTD., Netherfield. (M.S., 22/1/49.) Satisfaction December 10, of debenture registered May 18, 1937.

ROSENDALE PLASTIC INDUSTRIES, LTD., London, W. (M.S., 22/1/49.) Satisfaction December 7, of series of debentures registered October 3, 1942.

Company News

The directors of **Benn Brothers, Ltd.**, publishers of THE CHEMICAL AGE and associated journals, have declared the following dividends, less tax, payable on February 15, 1949: 3 per cent on the preference shares for the half-year ended December 31, 1948, and interim dividend of 5 per cent on the ordinary shares (same).

New Companies Registered

Chemi-Foam Products, Ltd. (463,116). Private company. Capital £1000. Objects: To acquire the business of synthetic soap manufacturer carried on by W. H. Hale. Directors: G. W. Tarr, W. H. Hale, and W. E. McCormick. Reg. office: 314 Kensington, Liverpool, 7.

Hempels Marine Paints Co., Ltd. (462,775). Private company. Capital £100. Manufacturers of paints, varnish, etc. Directors: I. Lunn, R. S. Yates. Reg. office: 33 St. James's Street, S.W.1.

Henry Heaton & Co., Ltd. (462,324).—Private company. Capital £7000. To acquire the business of manufacturers of soap and detergents carried on by Walter Baxandall, etc., as "Henry Heaton & Co." Director: W. Baxandall. Reg. office: Springfield Soap Works, Mumford Street, Bradford.

Koko, Ltd. (463,025). Private company. Capital £1000. Manufacturing chemists, etc. Directors: Mrs. A. F. Earl, W. Tagan, and A. F. McEvoy. Reg. office: 3 Fleet Lane, E.C.4.

Metro-Cutanit, Ltd. (462,968. Private company. Capital £98,000. Objects: To enter into agreements with Associated Electrical Industries, Ltd., and Cutanit, Ltd., to develop the property and assets to be acquired, and to carry on the business of chemical and electrical engineers, etc. Reg. office: 42 Pall Mall, S.W.1.

Chemical and Allied Stocks and Shares

SHARES of chemical and kindred companies have been steady, and were virtually unaffected by the attention drawn to the probability that the chemical industry would be next on the nationalisation list if the Labour Party was to win the next General Election.

Sentiment in industrial shares generally has been dominated by Sir Stafford Cripps' statement that he envisages the continuance of dividend limitation for another year and also by the growing assumption that the next Budget is unlikely to bring any material easing of the heavy weight of taxation.

With international affairs again in the headlines, caution in stock markets remained the watchword, and the bulk of investment business tended to centre on British Funds. The latter, however, failed to hold earlier gains, rumours of another gilt-edged issue (Jamaica may be the next borrower according to current talk) being an influence in this section. Nevertheless, both $2\frac{1}{2}$ per cent Consols and Treasury Bonds were again higher on balance, and 3 per. cent Transport also attracted a fair amount of attention although best levels were not maintained.

Imperial Chemical eased slightly to 48s. 9d., at which the yield is nearly $4\frac{1}{8}$ per cent, and Monsanto have kept at 62s. 6d.

Fisons were again 59s., Burt Boulton 28s. 9d., but Glaxo Laboratories have fluctuated around £22¾.

Shares of companies with plastics interests continued to receive more attention, particularly De La Rue, which strengthened to 40s. pending the interim dividend announcement. British Industrial Plastics 1s. shares were close on 7s. 3d., at which there is a yield of 5½ per cent on the basis of the recently declared 20 per cent dividend for the past financial year. British Xylonite, after rising further to £6¼, eased to £6⅛. B. Laporte 5s. units were firm at 21s. 6d.

Among other chemical shares, Albright & Wilsons have changed hands slightly over 31s., and Amber Chemical were up to 9s. 9d. Elsewhere, Hardman & Holden were 28s. 6d., and William Blythe 3s. shares again changed hands over 20s. Turner & Newall at 84s. have been quite well maintained.

The 4s. units of the Distillers Co. were 29s. 3d., with United Molasses 51s. 3d. Triplex Glass at 23s. 9d., and British Aluminium (50s. 9d.) were also steady, with British Oxygen at 102s. 3d., while British Glues & Chemicals 4s. shares held their rise to 22s.

Movements in iron and steels were again small and indefinite, but Colvilles hardened to 38s., Guest Keen were 49s. and Dorman Long 33s. 9d. Colliery shares were also subdued on wider recognition that it will probably not be until 1950 that their compensation values can be properly assessed. Settle Speakman at 70s. have risen sharply, there being further talk of a possible return of capital in this case. Powell Duffryn were firm at 29s. 1½d. Boots Drug showed steadiness at 56s. 9d., at which the yield is only 3½ per cent, but earnings are well in excess of the dividend payment, and this is a case where the market expects shareholders to receive more when dividend limitation is lifted or the Bonus Tax modified.

Borax Consolidated (63s. 6d.) remained firm and British Match were again 35s. 6d. Sangers have been well maintained at 34s. 9d. and Beechams deferred were 17s. 9d., yielding over 5½ per cent assuming the dividend total is kept at 40 per cent.

Oil shares lost ground. Anglo-Iranium at £8¾ still being affected by the Persian request for a larger share in the company's profits. Shell eased to 73s. 9d. and Burmah Oil were 70s., sentiment in this section being effected by the recent developments in the Middle East and by an easier trend in U.S. oil prices.

British Chemical Prices

Market Reports

ACTIVE trading conditions have been reported from most sections of the industrial chemicals market, the bulk of the movement being against contract commitments. A fair inquiry for new business has been in circulation and buying for shipment continues to be on a satisfactory scale. It has been reported that quotations for cream of tartar and tartaric acid have been reduced by 5s. a cwt. and 6s. a cwt. respectively, but the general price position is unaltered and the undertone throughout remains firm. There has been a ready outlet for available supplies of most of the soda products and the supply position is becoming less tight for items such as soda ash and bichromate of soda. Nitrite of soda and chlorate of soda have been in steady request at unchanged rates. The demand for the potash chemicals exceeds the quantities on offer and price conditions are firm. There is a steady call for glycerine, the supply position of which is expected to improve, and there has been a good inquiry for British-made barium chloride. The demand for the lead compounds remains active, unaffected by the recent increase in prices. With a slightly easier supply position, the coal tar products market is displaying a fair amount of activity. The export demand for pitch has been well maintained and some improvement in cresylic acid exports has been reported.

MANCHESTER.—Steady trading conditions have been reported on the Manchester chemical market during the week. Replacement buying in the leading alkali and other heavy products is described as fairly active and there is persistent pressure for deliveries against orders on the books. Recent price advances seem to have had no adverse affect on buying interest and new inquiries covering a wide range or products are circulating steadily. In several sections of the fertiliser market supplies are moving satisfactorily. The demand for the light and heavy tar products is on steady lines.

GLASGOW.—Conditions during the past week have been gradually returning to normal after the New Year holidays. The full quota of business has, however, not yet been resumed. The only materials which have been moving, however, are the normal day-to-day requirements and it is not anticipated that any unusual demands will be noted before the completion of this week. Difficulties caused in the supply position by the difference between the English and the Scottish holidays have not been outstanding this year.

Patent Processes in Chemical Industry

The following information is prepared from the Official Patents Journal. Printed copies of specifications accepted will be obtainable, as soon as printing arrangements permit, from the Patent Office, Southampton Buildings, London, W.C.2, at 2s. each. Higher priced photostat copies are generally available.

Complete Specifications Accepted

Liquid transfer apparatus.—Gresham & Craven, Ltd., and G. C. Marsh. May 27, 1946. 612,541.

Welding.—A. F. W. Hamilton, E. W. Harding, C. L. Railton and S. S. C. Mitchell. May 27, 1946. 612,557.

Production of amino-acids for use in the production of polymeric materials.—J. Lincoln. May 27, 1946. 612,559.

Controlled pressure vapour heating systems.—Vapor Car Heating Co., Inc. June 8, 1945. 612,574.

Provision of plastic compositions of a putty-like nature in forms suitable for ready use.—B.B. Chemical Co., Ltd., and L. E. Puddefoot. May 28, 1946. 612,575.

Production of vinyl cyanide.—E. I. Du Pont De Nemours & Co. May 30, 1945. 612,589, 612,590.

Corrosion inhibiting lubricating or other oil or grease.—S. C. Johansson. May 29, 1946. 612,591.

Method for production of high vacua.—Dow Chemical Co. June 13, 1945. 612,595.

Level controlling or indicating devices.—G. R. B. Pattison, T. Clutterbuck and H. D. MacLaren. May 30, 1946. 612,597.

Fastness of colourations on cellulose esters or other textile material.—British Celanese, Ltd. October 6, 1945. (Addition to 539,486. 612,601.

Means for aerial spraying.—Pest Control, Ltd., W. E. Ripper, A. K. Dorman, E. J. Marshall and P. W. Tudor. January 30, 1946. (Cognate application 17813/46.) (Divided out of 612,432.) 612,498.

Evaporating calcium chloride solutions.—Imperial Chemical Industries, Ltd., A. G. M. Hedley, F. M. Joscelyne and J. C. H. McEntee. March 25, 1946. (Divided out of 612,530.) 612,603.

Continuous apparatus for the manufacture of superphosphates and similar products.—R. & J. Moritz Entreprise. Jan. 6, 1939. 613,410.

Polyhydric phenolaldehyde resin adhesives.—W. W. Triggs. (Pennsylvania Coal Products Co.) May 9, 1944. 613,106.

Means for orientating irregular quartz crystals.—British Thomson-Houston Co., Ltd. June 5, 1943. 613,107.

Process of manufacturing mono-chloropyrazine.—American Cyanamid Co. Aug 25, 1943. 613,109.

Azo-dyestuffs.—Manufactures de Produits Chimiques du Nord Etablissements Kuhlmann. Dec. 31, 1941. 613,110.

Disubstituted derivatives of the aralkyl and hydroaralkyl isocyanate and the aralkyl and hydroaralkylamine group and process for the preparation thereof.—Laboratoires Française de Chimotherapie. 613,111.

Production of mahogany acids and their soaps.—J. C. Arnold. (Standard Oil Development Co.) June 20, 1945. 613,424.

Glassware forming machine.—T. B. Kitson. June 21, 1944. 613,428.

Method and apparatus for bending metal tubes.—P. D. Wurzburger. Nov. 15, 1945. 613,118.

Liquid-level indicators.—R. M. Hughes. (Scully Signal Co.) Nov. 27, 1945. 613,436.

Synthetic rubber compositions and methods of making same.—Firestone Tyre & Rubber Co. Dec. 30, 1944. 613,121.

Process and arrangements for the recovery of oils from fat animal matter.—Separator A/B. Jan. 11, 1945. 613,439.

Production of hot gases under pressure.—Brown, Boveri & Cie. A.G. April 5, 1945. 613,124.

Production of heterocyclic compounds.—I.C.I., Ltd., J. G. M. Bremner, and S. Beaumont. Jan. 17, 1946. 613,444.

Filter element or unit for air cleaners and method of making the same.—Houdaille-Hershey Corporation. July 5, 1945. 613,446.

Process for preparation of arylides of ortho-hydroxy carboxylic acids and of azo-dyestuffs therefrom.—General Aniline & Film Corporation. Oct. 19, 1944. 613,130.

Apparatus for effecting chemical analyses by means of dropping mercury electrodes.—C. M. Aleavy. Oct. 10, 1941. 613,133.

Expander rolls for fabric webs or other flexible sheet material.—J. R. Robertson. Feb. 21, 1945. 613,450.

Machine for grinding or polishing glassware and the like.—H. Carpenter. Feb. 25, 1946. 613,138.

Vapour temperature regulator for gaseous fluid supply systems.—Linde Air Products Co. April 11, 1945. 613,144.

Cellular glass and process of forming same.—Pittsburgh Corning Corporation. Oct. 10, 1945. 613,461.

Method of manufacturing steel wool soap.—A/K Goma Fabrikker A/S. April 29, 1939. 613,462.

Process for the catalytic aromatisation or hydroforming of hydrocarbons.—J. C. Arnold. (Standard Oil Development Co.) March 27, 1946. 613,463.

Atomisers, sprayers or the like.—General Stampers, Ltd., and W. Van Leer. April 9, 1946. 613,149.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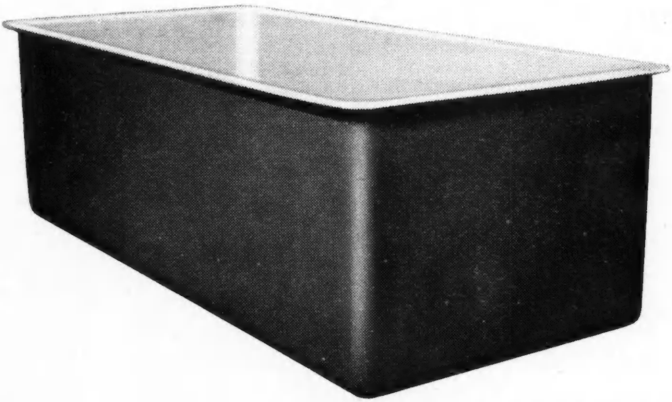

High-vacuum condensation or diffusion pumps.—Distillation Products, Inc. May 11, 1945. 613,468.

Antibiotic substances.—E. R. Squibb & Sons. May 9, 1945. 613,469.

Apparatus for measuring the rate-of-flow of fluids.—F. Postlethwaite. May 28, 1946. 613,478.

Preparation of guanidine derivatives.—Lederle Laboratories, Inc. June 14, 1945. 613,210.

Application of metallic coatings to non-metallic surfaces.—Philips Lamps, Ltd. May 23, 1942. 612,222.

Fluid separating means.—Shell Development Co. June 21, 1945. 613,229.

Anode assemblies used in nickel plating and nickel plating processes.—Mond Nickel Co., Ltd. July 13, 1945. 613,244.

Method of producing mirrors by chemical deposition.—F. H Verhoek, and W. L. Morgan. Feb. 6, 1946. 613,251.

Liquid atomisers.—S. Gimelli. Sept. 29, 1945. 613,161.

Production of phosphate coatings on metals.—Pyrene Co., Ltd. (Parker Rust-Proof Co.) June 13, 1946. 613,260.

Apparatus for drying, heating, and/or cooling flowable solids.—J. L. Erisman. June 13, 1946. 613,166.

Magnesium-base alloys.—Mathieson Alkali Works. Sept. 14, 1945. 613,167.

Manufacture of pyridinium compounds.—Roche Products, Ltd. July 26, 1945. 613,168.

Centrifugal sprayer for liquids.—D. Dunnet. June 14, 1946. 613,172.

Valves of the split-wedge gate type for controlling the flow of gaseous or liquid media.—R. A. Blakeborough, and W. Boyd. June 14, 1946. 613,266.

Thermosetting compositions.—E. I. Du Pont de Nemours & Co. June 13, 1945. 613,180.

Air circulating apparatus.—R. Poole. June 14, 1946. 613,269.

Fluid-flow meters.—R. Poole. June 14, 1946. 613,182.

Process for the production of substantially pure dehydrocholic acid.—A. Abbey. (Armour & Co.) June 14, 1946. 613,276.

Heat-insulating materials.—Midland Tar Distillers, Ltd. June 15, 1946. 613,201.

Press suitable for the extrusion of lead.—British Insulated Callander's Cables, Ltd., G. M. Hamilton, and A. Latin. June 15, 1946. 613,204.

Hydrazo esters.—Wingfoot Corporation. Jan. 16, 1946. 613,280.

Blanketed electric welding.—Linde Air Products Co. June 30, 1945. 613,295.

Azo esters.—Wingfoot Corporation. Jan. 16, 1946. 613,317.

Electric welding torch and method of welding.—Linde Air Products Co. July 13, 1945. 613,325.

Gas-shielded electric arc-welding.—Linde Air Products Co. July 26, 1945. 613,326.

Apparatus for dispensing predetermined quantities of liquid.—I. C. P. Smith. June 20, 1946. 613,334.

Hard alloys resistant to oxidation at elevated temperatures.—Hard Metal Tools Ltd., and E. M. Trent. June 21, 1946. 613,356.

Production of articles from multi-coloured plastic materials by extrusion.—J. Delorme. June 22, 1945. 613,358.

Process for the preparation of 2-alkyloxy-or-alkenyloxy-5-nitro anilines and their salts.—N.V. Polak & Schwarz's Essencefabrieken. July 11, 1945. 613,367.

Surface treatment of aluminium and aluminium base alloys.—Aluminum Co. of America. Oct. 14, 1940. 613,487.

Process and culture medium for the production of penicillin.—E. Lilly & Co. Aug. 24, 1945. 613,488, 613,489, 613,490, 613,491, 613,492.

Polymeric materials and processes for their production.—J. W. Fisher, E. W. Wheatley, and H. Bates. May 10, 1945. 613,497.

Method for drying, heating and/or cooling flowable solids.—J. L. Erisman. June 13, 1946. 613,206.

Dehydration of gypsum.—I.C.I., Ltd., M. H. M. Arnold, and R. J. Young. Jan. 17, 1947. 613,207.

Shaping of sheets of polymerised unsaturated esters of polybasic acids.—Pittsburgh Plate Glass Co. May 28, 1942. 613,506.

Processes for the production of amino compounds. J. Lincoln, B. Ellis and G. G. Richardson. June 28, 1944. 613,807.

Olefin polymerisation.—Phillips Petroleum Co. July 14, 1941. 613,509.

Means for condensing and removing vapour from a gas vapour mixture, such as moist air.—J. H. H. Brown (Aktiebolaget Svenska Flaktfabriken). Feb. 27, 1945. 613,811.

Production of malleable iron.—General Electric Co., Ltd., D. M. Dovey and S. V. Williams. May 24, 1945. 613,514.

Production or treatment of celloluse derivative or synthetic resin materials.—J. G. N. Drewitt and H. K. Stevens. June 7, 1945. 613,817.

Treatment of textile and other materials having a basis of cellulose derivatives or synthetic resins.—J. G. N. Drewitt and H. K. Stevens. June 7, 1945. 613,818.

Process of orienting crystalline resinous bodies. A. H. Stevens (Firestone Tire & Rubber Co.). June 15, 1945. 613,820.

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